INDUSTRIAL ARTS and VOCATIONAL EDUCATION

February, 1938
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OUR NEXT ISSUE

The March issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will again bring Bruce's School Shop Annual to its readers. As in previous editions of this Annual, the school shop will be the focal point of the content matter.

Among the articles featured will be the following: "Laboratory Planning," by William L. Hunter, Department of Industrial Arts, Iowa State College, Ames, Iowa; "Organization of the Industrial-Arts Laboratory," by Harold M. Gray, Kansas City, Kans.; "Shop Management, Material, and Record Control," by Joseph A. Schad, High School, Newport News, Va.; "Vocational Opportunities in Aviation," by John Rogers, Philadelphia, Pa.; "Experiment in Correlation," by Lester C. Smith, Laboratory Schools, University of Chicago, Chicago, Ill.

Besides the foregoing, there will be numerous other articles on courses of study, shop layouts, shop management, safety, shop forms, and the like.

As in previous years, this special issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will be considerably larger than the ordinary issues, and will contain material of vital interest to everyone connected with the school shop. The equipment, and materials and supply lists, will be made part of the Annual as heretofore.

FEBRUARY AND MARCH CONVENTIONS

February 23–26. American Council of Guidance and Personnel Association. Atlantic City, N. J. Secretary, Arnold Hess, State Normal School, Newark, N. J.

February 23–26. National Vocational Guidance Association. Atlantic City, N. J. Secretary, Dr. Fred C. Smith, Knoxville, Tenn.

March 10–12. Southeastern Arts Association, Tampa, Fla. Secretary, May Kluttz, Hoke Smith Junior High School, Atlanta, Ga.

March 20–22. South Carolina Education Association. Columbia, S. Car. Secretary, J. P. Coates, 1218 Senate St., Columbia, S. Car.

March 24–26. Florida Education Association, Tampa, Fla. Secretary, James S. Rickards, 33 Centennial Bldg., Tallahassee, Fla.

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Editorial Contributions — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.
The Magazine is on sale at Brentano's, New York; Wanamaker's, Philadelphia; Brentano's, Chicago; Philippine Education Co., Manila, P. I.

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DELTA MANUFACTURING CO.

600-634 E. Vienna Ave. Milwaukee, Wis.

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION

Top Men Wanted!

Joseph Bird

Instructor in Personnel Relations, Babson Institute for Business Education, Wellesley, Massachusetts

Upon arriving at my office this morning, I found on my desk a pamphlet which read:

"What happens when youth leaves school and cannot find Jobs? This is a problem of deep concern to every community."

The mail was delivered and it contained letters from several leading industrial and business institutions, excerpts from some of these letters reading as follows:

1. "If you have one or two young men who, in your opinion, are particularly outstanding, we shall be glad to review their history."
2. "We are interested in selecting a few men who are absolutely 'tops' in their schoolwork, background, etc., to date."
3. "If you care to send me the data and qualifications on one or two of your top men we will be very glad to carefully consider them and some one of us can arrange to see them in Boston or New York prior to their graduation."
4. "We have some interesting openings in merchandising lines and sales promotion, and in retailing. I would like to interview any of your graduates when they are in New York."
5. "If you have any young men who have received a prior degree in metallurgy, we would be glad to hear about them."
6. "We have openings for two salesmen in our retail sales department. We shall be interested in interviewing a few men who have sales ability. A good man should make at least $2,500 in his first twelve months in the selling field."
7. "We shall have openings within the near future for one or two qualified individuals. As primary qualifications we would prefer that they be college trained, under thirty, Christian, previous business experience not essential, aggressive, personable, and of an analytical mind."
8. "We would be glad to interview any candidates selected by yourself, at any time they are in New York."

Top Men Can Pick and Choose

The telephone rang and the official in charge of college recruiting for one of our nation's largest industrial concerns was on the wire stating that he would be interested in interviewing one or two of our outstanding men. I told him something of my situation — that leading men seem to be in demand everywhere. His answer was:

"There is keen competition today between business and industrial institutions in selecting outstanding college men. Some outstanding seniors have as many as ten offers for employment and the decision rests more with the upper college senior as to which institution he shall decide to work for, than with business and industry by whom he is to be employed.

"My contention is that every young man who has demonstrated by his schoolwork that he has the 'stuff' has no worry so far as a job is concerned."

Our educational institutions do have the task, however, of helping students find their particular aptitudes, of helping them see that some particular piece of schoolwork will some day have definite relationship with a particular job which is to be done.

I am not sure that a placement officer should recommend all of the institution's graduates. This problem, old as it may be, goes back to the problem of admissions, curriculums, and standards. It is still possible for most any young person to be able to find some institution of higher learning which will admit him. He can then select a course or courses which will give him a few credits. If the going becomes too difficult, he can transfer to another institution and after he has (literally) served enough time pursuing a so-called higher education, some institution will graduate him. Then he becomes the adopted child of the placement office. The pathetic thing is that he expects the placement office to get him a job. He doesn't know what kind of job; he simply says: "Give me a job where the advancement will be rapid, where I can make big money fast."

New Job For Schools and Colleges

Only a few years ago, our graduating students did not expect their Alma Mater to find their jobs, to make contacts for them, and to practically deliver them to the doors of business for their first morning's work. All that the young people asked from the colleges were recommendations and perhaps a few suggestions.

Today our graduates expect the institutions to find the jobs for them and in some cases even to write their letters of application because some feel that they lack ability to write good business letters. Still we are graduating them, and in some cases with honors.

We have recently mailed letters to several leading business and industrial concerns inquiring concerning possible employment for some of our "spring" graduates. Selections from the more favorable replies have already been given. Here are some excerpts from some of our discouraging letters:

1. "Your letter will be placed on file for future reference in the event any opportunities arise."
2. "At the present time we have no positions available."
3. "Just at present we are not taking applications."
4. "At present there is no opening in our organization in which the services of men having the training such as you describe could be used to our mutual advantage."
5. "At the present writing it doesn't seem probable that we will add any men to our force this year."
6. "I regret to have to advise that we would have no place where we could use any of these men."

Do these business and industrial concerns

The implications contained in this article, while referring specifically to the field of business education, are equally applicable to the field of teacher training for industrial arts and vocational education, and for the products of the apprenticeship courses and of the vocational and trade schools.

have vacancies? Would the right young man appearing at the office at the right time be given favorable considerations — if not "right now," at a future time?

Always a Job for Right Man

Business and industry are at all times looking for outstanding young men, and they are at all times willing to take all of the time necessary for interviews with these young men who are of the "future executive" type. Big business is not interested in mediocrity.

Perhaps education has been too interested in pulling the failing or near-failing student up by his boot straps so that he may be able to stay in the institution instead of seeing that the upper one tenth are getting everything that the institution has to offer. This upper one tenth is what business wants; so if our educational institutions were filled with these men, there would be no need for a placement officer, because the one tenth would be much sought after by business. In fact, the college employment officer would be asking business for a job for himself.

Industrial Arts in the Recreational Program

Robert C. Sutor

Director of Industrial Arts and Physical Education,
Public Schools,
Lake Bluff, Illinois

Extending the beneficial aspects of industrial-arts work beyond the classroom and the school year.

The park board of Glencoe, Ill., during the past summer found a solution for the problem of occupying the leisure time of boys and girls in that community during the vacation months. It is true that a large number of children are fortunate enough to be able to attend scout, Y.M.C.A., or private camps, but there are larger numbers who must spend the summer months within the city limits, and it is these children with whom the parents and people of the communities are concerned. The park board at Glencoe included this summer for the first time, an extensive crafts program as a part of its regular playground activities. A full-time instructor, experienced in craftwork, was hired to teach handicraft to any child who was interested in the work. The playground committee estimated that there would be 200 children participating in this program by the close of the summer, and was pleased to learn that as the activities neared an end, there had been 360 working on the various craft projects.

Handicrafts on the playground promote the worthy use of leisure time; the development of avocational interests such as art expression, experimentation, and initiative; the opportunity for explorational experiences with materials and tools; the development of habits and attitudes coping with environment; consumer knowledges and appreciation of materials used. The foregoing points are a part of the "Warner Philosophy of Industrial Arts" as given in *A Prospectus for Industrial Arts in Ohio, 1934,* and are undeniably practical objectives for handicrafts on the playground. There is also the highly worth-while development of creative abilities which permits the child to broaden his knowledge of the thing he is interested in as an outcome of experiences acquired through handicrafts.

The variation of crafts is unlimited for there are always new ones that can be developed and also, there are always new projects evolved within specific craft units. The outstanding project types offered in Glencoe were brass tapping, beadwork, wood etching, wood carving, glaze painting, and leathercraft.

Each individual craft in itself must provide numerous variations in regard to designs and methods of procedure. For the brass-tapping plaques there were used a wide range of animal designs as well as scenic or modernistic designs, depending upon the interest of the child. In addition to these, there were used designs emblematic of the playground. Children readily select projects of their own interest when they can clearly visualize results and possibilities.

In beadwork, the children found expression in the use of colors with the Indian seed beads and wood beads of every hue. Headbands, bracelets, purses, belts, and rings were made in varying color designs.

Bass plywood, ¼ in. thick, good on one side, was used for wood etchings to reduce cost of materials. Electric burning pencils were furnished by the board as part of the equipment. Rectangular plaques 4 by 5 and 5 by 6 in. were cut from the plywood. Designs used for brass tapping were traced on the plaques for etching besides other patterns from which the children were allowed to choose according to their tastes. Including variety in designs for wood etching, there are also many ways of shading and stippling the wood with the electric burning pencil.

Wood carving lends itself to many possibilities such as book ends, novelty boxes, wall plaques, letter holders, paper knives, figurines, and arrowheads. This particular group of children were most interested in arrowheads on which different Indian designs were carved. Much interest in this craft was brought about by the use of the electric pencils for shading the pattern and border on the plaque after all carving was completed.

A novel craft that attracted a large number of children was glaze painting or glowing glass. Materials for painting are expensive if purchased ready for use. When a large amount of glass is needed, the most economical way to buy it is to purchase a case of glass and cut it to the desired sizes. Black glaze paint for silhouettes is the most practical for general purposes. Colored paintings may be made if desired. Two types of frames were used: the regular wooden frames and passe partout.

The most popular of all the crafts was the leatherwork. Outstanding projects made were bracelets, lanyards, belts, both braided and link, purses, billfolds, key containers, wallets, moccasins, and dog collars. The lanyards, bracelets, and dog collars were made of leatherette 3/16 in. wide, in numerous colors and color combinations. Whole calfskin hides were purchased from wholesale leather dealers for cutting the various patterns of leather projects.

The program was divided principally between two playgrounds. One morning a week the more simple crafts were offered to a midget group on a third playground. Instruction in handicrafts was given without interruption for ten weeks from 9:30 a.m. until noon and from 1:30 p.m. until 5 p.m. There was no compulsory attendance and the boys and girls were allowed to come and go as they pleased. It was gratifying to note that large groups came

early and stayed until closing time. The afternoon session was originally intended to be divided into two periods for the purpose of handling the boys in one group and the girls in another. Because of the number of children coming to the playground for the express purpose of doing handicrafts, it was necessary to utilize all the time possible, therefore, the crafts were opened to the whole group for the entire time available. Following is a typical weekly program:

Monday	10:30–12:00 Central playground
	1:30– 5:00 North playground
Tuesday	1:30– 5:00 South playground
Wednesday	10:00–12:00 South playground
	1:30– 5:00 North playground
Thursday	1:30– 4:00 South playground (Negro group)
Friday	9:30–12:00 North playground
	1:30– 3:30 South playground

The combined enrollment of the playground was 318 children. The total enrollment in the handicrafts section was 360. Although the crafts were a part of the playground program, quite a number of children who came only for that purpose were not registered on the play-group list. The interest manifested is clearly evident when one considers the foregoing figures. When the playground opened, the committee in charge estimated that the craftwork would interest 200 children of all age groups. To their amazement, that number was listed on the files after the first three weeks. They also estimated that the size of the groups would occasionally be as many as 20 children. It was not unusual to have groups ranging from 45 to 60 boys and girls. At no time were the classes smaller than 20 or 25. The ages of the children ranged from 5 to approximately 16 years. Most of the children were between 9 and 14 years. The one colored group had 30 children of approximately all ages.

Successful handling of a large group of boys and girls is essential to maintaining the interest at all times. The most effective method used was to have the boys and girls who rapidly grasped various procedures for making the different projects help the beginners in a new craft. It is necessary to get the children who are adept and who are willing workers. Much can be done to keep the work progressing by using older and dependable children to hand out the materials and make records of all projects made, including the cost of the articles. Available staff members were used to help with the more difficult procedures and to assist in finishing intricate steps involved in the completion of the articles, such as ending lanyards or bracelets and putting picture-framing material on the silhouettes.

The value of exhibiting craftwork done by the children is extremely worth while as it gives the parents an opportunity to see what the children are capable of doing. If an exhibit is to be a true showing of the crafts, it is essential that all children be urged to contribute their projects for display. The result will be a cross section of the work completed. Another worthwhile purpose of an exhibit is that it promotes interest among the children who are seemingly a bit uninterested in the activities of the group of which they are a part. To increase interest, the names of the children contributing projects were placed on their individual articles. The exhibit was placed on a large window of a prominent Glencoe store and was on display for almost two weeks. The parents expressed much interest in the exhibit and many favorable comments were made.

When undertaking any project, the financial aspect must always be considered. Glencoe has a community chest from which the park board receives money. This year part of that fund was available for handicraft materials. When the possibilities for having a craft program were developed, it was thought advisable to set a price on each item and allow every child a limit on materials given free of charge. Above this limit all supplies were paid for by the individuals. The reason for setting the limit was to give all children coming to the playground throughout the summer an equal opportunity to avail themselves of their share of materials from the community-chest funds. Unexpectedly, the bills for the materials mounted rapidly as the interest grew, and by the latter part of July it was necessary to request full payment from the children for all projects made. The approximate price range on all articles was from 5 cents to $1.50. At the close of the summer, the bills for all materials and necessary equipment totaled about $290. All items were sold at cost.

An accurate record in handicrafts was kept for every child and all materials obtained were recorded. The total cost of materials purchased by the children was $248.62, of which $85 came from the community chest. Following is a list of the projects made in each craft and the sale price:

122	Wood etchings	$ .05	
72	Brass tappings	.18	
96	Glaze paintings	.05	
17	Glaze paintings	.10	
7	Glaze paintings	.15	
3	Glaze paintings	.25	
1	Glaze painting	.20	
21	Purses, billfolds, etc.	.56	(average)
18	Braided belts	.60	
168	Link belts	.50	
431	Bracelets (round and square)	.08	
129	Bracelets (flat)	.10	
244	Lanyards	.16	
17	Bead bands	.10	
5	Dog collars	.32	(average)
7	Watch straps	.15	
16	Moccasins	1.45	
35	Bead bracelets	.05	
5	Bead belts	.35	
2	Cord belts	.35	
19	Wood carvings	.08	

In furthering the interest of handicrafters, there are always new and intriguing fields that may be entered. Some crafts that might prove attractive to children which have not been mentioned in this article are: Reedwork or basketry, metalcraft, archery, model boats or airplanes, linoleum-block printing, wood inlay, Indian lore, horncraft, fiber cord, and birchcraft.

The results of this program show that handicraft can be a media for broadening our field of industrial arts. Children of all ages are interested in doing things. Why not provide a program that is educational instead of merely enjoyable? Industrial arts today endeavors to bring students in contact with material things in such a way as to guide them toward individual interests and abilities and give them a better understanding of what is going on in the industrial world as well as directing them toward life occupations in which they will prove capable. A craft program is, without doubt, in line with the meaning of industrial-arts education. When a program of crafts is the outstanding function of all playground activities, it is surely proof that such activity should be developed to give the children of every community an opportunity to avail themselves of the many possibilities in handicrafts through the summer months.

A CAREFUL READER:

1. Reads with a definite purpose, a problem, in mind.
2. Grasps the author's point of view and central theme.
3. Lays hold of the order and arrangement of the author's ideas.
4. Pauses occasionally for summarizing and repeating.
5. Constantly asks questions of his reading.
6. Continually supplements from his own mental stock.
7. Evaluates the worth of what he reads.
8. Varies the rate of his progress through the reading.
9. Ties up what he reads with problems of his own.

— *Rollo L. Lyman*

The measure of a man's real character is what he would do if he knew he would never be found out. — *Lord Macaulay.*

Trust men and they will be true to you; treat them greatly and they will show themselves great. — *Emerson.*

Essentials of Education

E. A. Rerucha

Wakefield Township High School,
Wakefield, Michigan

Educators are always confronted with the task of scrutinizing their own work critically and then inaugurating the proper steps to make educational offerings fit humanity's real needs.

It is generally accepted that the public school is a social institution and a form of community life in which the child has an "opportunity to share in the inherited resources of the race"[1] in order that he may properly adjust himself to his environment. "The individual must not only be personally efficient; he must be socially efficient."[2]

This philosophy of education is simple to understand, but to fulfill its aims is the difficulty which educators have always faced. "Just how is the citizen to be educated? What is his education to include? What emotional attitudes, what kinds of knowledge, and what sort of activities should the individual have developed in him in order that he may become a good citizen? What are the types of responsibilities he will have to meet and what are the lines of adjustment he will have to make, in order to be worthy of the privilege and qualified to fulfill the duties of citizenship?"[3]

It is a comparatively simple matter to prescribe the type of training necessary for success in any particular vocation, but, is it as simple to prescribe a vocation for any particular individual? Can we ascertain the qualifications for success in an individual for any particular vocation as simply and as definitely as we can identify, let us say, the different chemicals by their reactions? Many statements made in the past few years seem to imply that we can. Furthermore, if we are to take such statements seriously, we must obviously assume that those who made them have discovered the answers to the questions raised in the foregoing paragraph, as these are typical questions which must be answered in the course of determining what subjects and knowledge areas are essentials and nonessentials! And how can we reconcile his statement in regard to the teaching of science with the following: "The prosperity of any nation, and its ranking position in the competitive economic world, will depend more and more as civilization advances upon scientific training of *all classes of its citizens*"[4]

One of the fundamental principles of the administration of public-school education is that schools which are supported by general taxes and operated for the welfare of the whole public must be open to the children of all citizens on equal terms. Furthermore, the tuition must be free, the schools must be equally accessible to all, and there must be a freedom of choice, as far as the individual's intelligence permits, in the courses offered.

If we do not provide for the boys and girls who attend our schools, the equality of opportunity to share in the educational opportunities offered or available by denying them the freedom of choice of courses offered, or by offering only absolute necessities, we must then admit that we are in a measure reverting to the old order of things as they existed in socially stratified nations "where one's occupation and consequently his educational training were largely decreed by the social and economic position of his parents."[5] This is not the American idea of education as fostered by our schools, nor is it likely that a well-informed public would subscribe to such an idea.

Bearing in mind the accepted function of education, which is that education is a socializing agency having as its goal the ultimate social efficiency of the people, are we not justified then in offering as many courses as are within our means, which will provide at least the fundamentals of training for social, economic, cultural, and political life? By following this educational policy, are we not less likely to jeopardize the right of every child to share in the educational opportunities in as large a measure as possible?

In times of economic stress, it is to be expected that increased criticism of the schools will be made, also that many of them will probably be ready to correct any mistakes that have been made in the past. The teacher and administrator who have been consistently making an honest effort to help youth in attaining the accepted objectives of education and have kept abreast of the times professionally, should find it less difficult to make the necessary adjustments to meet the demands of such economic conditions and be competent to muster the available and necessary facts and data to combat the criticism lacking a sound basis and its pernicious results; namely, the pruning of the branches of the educational structure. It is the duty of every sincere educational worker as well as the layman to combat and eradicate the effects of snap-judgment criticisms directed at the educational system from all sides, unsupported in many instances by intelligent reasoning, and too frequently based upon personal opinion alone. The time has passed when any individual who has met with success in his particular vocation, can consider that as sufficient qualification to intelligently dictate and attack the policies in the educational, or any other field, without diligent and unbiased research and study beforehand.

Educators on the contrary, must ever be ready to admit errors, revise programs if necessary, and do everything possible to formulate plans, establish objectives, and above all, explain in simple, direct, and nonapologetic language the true worth of the various subjects in the curriculum to the critical taxpayer, who has a right to expect and demand that. If the worth of any subject cannot be proved to at least the intelligent taxpayer, there is no reason given why that subject should not be labeled as a nonessential. After all, education in one respect is a process of separating the sheep from the goats, the essentials from the nonessentials.

The Molder

I observed a student molding,
Casting patterns in the sand,
Smoothing out the roughened edges
With his "slick," and careful hand.

First, he gently taps the pattern
Which he takes from out the mold,
Preserving all the minute likeness
Which the cast will later hold.

It is thus in molding manhood
In the growing child as well.
All the faults and imperfections
Later years are sure to tell.

Teachers often are the molders
Building for a perfect "cast."
Gently smoothing out the pattern,
Teaching habits that will last.

Habits are the constant builders.
Let's control them with a hand,
Carefully and with the patience
Of the molder with his sand.

— Orville Hayford.

[1] John Dewey, *My Pedagogic Creed*, p. 7.
[2] Walter Robinson Smith, *Educational Sociology*, p. 13.
[3] *Ibid.*, p. 145.
[4] *Ibid.*, p. 147.
[5] *Ibid.*, p. 218.

Grading the Industrial-Arts Student

Allen A. Cooper

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Some considerations involved in giving grades.

The time for grade cards is again approaching and the industrial-arts teacher must evaluate as nearly as possible the myriads of characteristics and achievements of those in his charge.

Just as the student's father draws a pay check from his employer in return for services rendered, so the student draws his pay check in the form of grades from the school in return for scholastic attainments. In either situation, the rewards are determined largely by achievement, and the person holding the reward is the judge.

Psychological Effect of Grades on the Student

The employed man generally knows what his compensation is going to be before he receives his check, but the student does not know definitely what he is going to get. Generally, he has a pretty good idea but the subjective methods of evaluating the boy or girl make his expectation uncertain. On the other hand, boys and girls have very definite reasons of their own upon which to base their expectations. In their own minds, they have a pretty fair evaluation of their work, although some teachers hate to admit its validity. Here is where the psychological aspect comes in. Suppose the grade given the student is above his expectation, then he arrives at the conclusion that he is better than he really is, and may begin to neglect his work, thinking that he can get by the next time on his reputation. On the other hand, he might assume that he has not been doing his best work and that with added effort he can get still higher grades. This attitude might persist until, at the next marking period, he again gets the same grade. His ambitions then are squelched, and he sets up adverse attitudes against his teacher and the subject matter in question.

The teacher's task is a very delicate one when it comes to giving grades. Suppose a pupil has been working to the best of his ability and is given a failing grade. This is an indication to the pupil that, at his best, he is still a failure. This attitude is strong enough to defeat even the strongest of personalities. Grading is one of the most effective potential factors in education, not from the fact-finding standpoint, but from the standpoint of the development of attitudes and self-confidence. Sometimes it seems that too much of a premium is placed on grade-getting and not enough on the essentials and indirect learning that is to be measured.

Arbitrary Methods of Estimating a Grade

How many teachers have an "air-tight" and objective method of evaluating a pupil's grade? How many teachers even realize every factor taken into consideration when giving grades? The individual interests, the home environment, the native endowments, past experiences, and hundreds of other factors vitally affect the present work of the pupil. It is impossible for the teacher, both from the standpoint of time and practicability to accumulate all of these factors and consider them at grade time. A great deal of the fault actually lies with the pupil himself for not confiding in the teacher more than he does so that the teacher may know him better and more intimately.

A great number of teachers will say, "I do not have an arbitrary method of evaluation. I have a group of standards by which I measure every one of my pupils and I grade them according to their position on my scale." Such a teacher must remember that he is measuring the pupil entirely on the tangible and objective work that he is doing, and has entirely ignored the personality of the individual and the attitudes, ideals, and habits, that have been formed because of the work in spite of the social influences and environment to which the pupil is subjected. The indirect results of teaching ought also to be considered in grading. Many facts are taught for the purpose of establishing desirable attitudes and ideals, so that through proper interpretation, the student may become a better citizen, well equipped for life and living. The English classics are taught not because the student should know them from memory, but because the aesthetic appeal, the beauty and spirit that flow through them, can to some extent, be absorbed by the pupil, and the greatness and courage of their characters serve as examples for our youth today.

The value of making a footstool or a table, or any other article in the school shop does not lie in the article itself but in the satisfaction which the pupil gets from making it, the things which he learns about construction, proportion, and the like. There is a sense of satisfaction or mastery there, which gives the pupil a feeling of self-reliance in his ability to make useful and beautiful things. The stool may look very crude to the teacher, but it may be an unusual accomplishment in the eyes of the boy. This, after all, is the important thing.

The value of having the boy serve his time in the tool checkroom does not lie in the fact that he learns the names of the tools, but rather that he has an opportunity to serve his classmates in the spirit of co-operation, and that by carefully arranging and placing tools in their proper places, he learns the value of orderliness, which is sometimes referred to as "good housekeeping."

The value of foremanship does not lie in the fact that it relieves the teacher of some of his routine affairs, but in training the pupil to become a leader. The foreman learns a few things that the ordinary individual in the class does not have to deal with. He is confronted with the problems of the entire class and benefits from each one of them.

It is necessary to acquire a certain number of facts — facts that will aid in the business of life, but it is of more importance to develop very definite rules for living and it is through the interpretation of these facts and their application that we can develop these rules. The following are a few of them: Honesty, courtesy, cooperation, self-reliance, leadership, integrity, "law-abidingness," and the like.

Shall We Set Up Standards?

The human being is an individual with individual traits and characteristics fostered and developed through experiences in an environment buffered with native endowments. The standards commonly referred to as honesty, courtesy, initiative, and the like, may have been emphasized, but to each individual, these standards have different meanings. Probably there are as many different meanings as there are individuals.

Now, if the teacher attempts to set up standards by which he can grade, he may run into a snare. In grading, he will, of course, use his own conception of the things which he is grading, ignoring the pupil's conception. He can judge what the student is worth only on the basis of what he thinks the pupil can do in proportion to what he has done.

When Are Failures Legitimate?

There is a grave question whether failures are ever legitimate. Surely the type of teacher who regularly fails a certain

per cent of his pupils in order to balance his curve of distribution has passed on into retirement. If he has not done so, it is high time that he does.

If the conscientious teacher will diagnose the work of his failing students, studying the problem both from the pupil's and the teacher's standpoint, he will be both surprised and alarmed to find that his responsibility for that failure is not small. On the other hand, no teacher is immune from mistakes. The majority of teacher mistakes are made unconsciously, and more than likely he will never be aware of them. The reason they are made is because teachers do not know their pupils as well as they should. It is not humanly possible to know everything about them, but if the teacher would forget that he is teaching subject matter for a while and teach boys and girls instead, he could undermine a great deal of the failures.

Failure should not be based upon the learning. Any individual, no matter how low in intelligence, who has gained admittance to the public school, is able to learn to a certain degree. It is not so much what and how much the student learns, but how he uses it. There are many intelligent men in our prisons today.

A failure should never be given without due notice and a prior conference so that the pupil in question will have the opportunity to improve his ways and bring up his requirements to a passing point. It is not until the pupil himself refuses to do anything about it that a failure becomes legitimate. He ought to be consulted about what he thinks he is worth. This phase of grading is frequently neglected. Of course, the teacher need not give the pupil the grade he thinks he is worth every time, but it brings about a discussion between student and teacher that will serve in orienting the student and will highly facilitate a pupil-teacher relationship. There are many teachers of large classes in academic subjects who do not become acquainted with some of their pupils even though the pupils sit in their classes for an entire semester.

The "grade-conference" scheme referred to is an interesting and worth-while method and teachers who have not tried it will be astonished at the results. They will find out a lot of things about their pupils that they have never known before. It must not be forgotten that tact will go a long way in a conference of this kind.

Absence and Grading

In industrial-arts work where there is no outside preparation and little chance to work extra time after school hours, absence is a serious factor in giving a grade. According to the school laws, a pupil should be in attendance a certain number of hours per week, and a definite number of weeks per year to earn credit for promotion. A certain amount of absence is expected, for which no deduction to grades is given. There are two kinds of absence — excused and unexcused. Excused absence requires the teacher to allow the pupil to make up the work lost through absence. Unexcused absence leaves it optional with the teacher to allow the pupil to make up lost credit. Conscientious teachers usually allow work to be made up in either case. The sad fact is that rarely, if ever, does a pupil ask to make up this back work. If the pupil does ask to make up work in the shop, a very convenient way is to give him a book on some related subject in industrial arts and have him give a written report on what he read. If it is the custom to keep the shop open after school hours, then he should be asked to come at that time and make up in full what he lost.

If such a pupil does not attempt to make up the time that he has lost, then his grade should be cut, in order that the pupil learns the value and need of regular attendance.

Should Extra Credit be Given for Home Shopwork?

It is advisable not to give credit for home shopwork. There are several reasons for this. One of them is that credit may be given for work that someone else has done. The boy may bring his father's hobby work to school and pass it off as his own. Even if the student presents his own work, it has been done without supervision and is, therefore, usually of a poorer type. Or the father or some other member of the family may have played the role of supervisor, and if the teacher attempts to criticize the work that has been done, he is likely to reap antagonism from those at home who had a hand in the supervision.

The argument for giving credit is that it might encourage the boy to set up a workshop at home, and thereby acquire a hobby with which to occupy his leisure. This, however, can be just as successfully handled in another way.*

Idleness and Grading

John got a low grade last semester because he was lazy and idle most of the time when he was not being supervised. Whose fault was it that John was idle and lazy? Could his attitude have been altered? Each teacher must conscientiously study such cases. Frequently there is a possibility of correcting such trouble, at least to a certain extent. Of course, the lazy student lacks interest, but why? It may be his health, former grades, a rebuke, failure to master more elementary tools of learning, and the like.

Before John got his low grade, the teacher should have studied him carefully. He might in that way have discovered his interests, so that the work could have been attacked from that angle. If no angle of appeal can be discovered, then, and only then, is the student deserving of the low grade.

Discipline and Grading

"Teacher, why did I get such a low mark this time?"

"Because you shot paper wads, chewed gum in class, and talked too much when you were supposed to be studying."

Does that sound familiar? The teacher, in this case, is putting the entire value of his subject on three things: Paper-wad shooting, gum chewing, and talking during study period. The pupil assumes that if he had not shot paper wads, chewed gum, or talked during study period that he would have made a good grade. Utopian educators and sublime theorists will say that the child should have been interested by a wide-awake and alert teacher and that such incidents as these should never have happened. Such things do happen, however, in thousands of classrooms and the best teachers in the world cannot eliminate them entirely. It is natural for children to do things of this kind because others with whom they associate do them. A busy pupil does not get into serious mischief. It takes associates to lend courage to mischief. If the associates are busy, there will usually be no trouble. There are very few cases where a grade should be affected by the deportment of the pupil.

Giving Incomplete Grades

Incomplete grades are necessary evils. They make extra work and bother for the already overloaded teacher. They put extra work and worry on the pupil who has to make them up. They are a device for eliminating low or failing grades where the case in question warrants the extra work.

If a student has been sick for a long time and is far behind in his work then he may be given an extension of time to complete his back work. It is desirable to give the pupil that is likely to fail, a last-minute opportunity to make up that back work if he suddenly becomes desirous to do it instead of fail. Incomplete grades should never, except in rare cases, be held over more than two weeks after the grades have been given.

Grades Must Be Defensible

The teacher should never issue a grade unless he is absolutely sure that he can defend it should a question arise as to its validity. Parents, especially, can cause a great deal of trouble unless the teacher

*INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, November, 1936, pp. 329, 330.

can sit down and very carefully point out reasons for the grade and make suggestions as to how it can be improved.

Frequently, the teacher tries to decide whether to give the pupil an *A* or an *A*—. His record may place him right on the dividing line. In such a case, the student's indirect learning will have to be taken into consideration.

It is much easier to give the pupil the higher grade, and it is much easier for the pupil to receive it. It will make the pupil more satisfied with his work and will give him more self-confidence. Besides, the teacher may have a more cheerful pupil to work with throughout the course.

Teachers may become alarmed because their grades are skewed toward the upper part of the curve of distribution. There is no necessity for alarm, because the subject of industrial arts is, in most cases, an elective. In any subject that the pupil elects, he may naturally be expected to make a higher grade than in a subject that he is required to take.

Holding Grades for Unpaid Bills

It is perfectly legitimate to hold a pupil's grade until he has paid up pending bills or has returned borrowed equipment. It is advisable, however, to get the principal's or superintendent's permission before this is done.

Again, it is well to remember that the grade given to the pupil is his "pay check" for his achievements. It indicates to him in letters or figures, rather than in dollars and cents, what his achievements are worth. To decide what grade has been earned, presents the teacher with one of his most serious problems, and it cannot be solved by making a snap decision.

The Basic Causes of Accidents

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Getting to the source of accidents is the best way of eradicating them.

Preventive safety work or education in our shops is possible only after we have determined the basic causes of the accidents that occur in them. In order to determine such underlying and basic causes of an accident, it is sometimes necessary to analyze rather minutely the conditions which operate to cause the accident. Only after doing this and determining the basic cause, can we develop ways and means of eliminating a recurrence of that particular accident.

Too frequently accident statistics mistakenly designate types of accidents as causes. For example, in a recent study on safety in school shops, the following items were among those listed as causes: Falls, slippery floors, struck by objects, hand tools, handling materials, machines.

After analyzing the statistics in connection with this study, a reader would have accomplished little, for these items in themselves are not *causes* of accidents; they are classifications of *types* of accidents. Probably not one of the accidents recorded in the study or in any other study was caused by any one of the classifications given above.

For example, it is difficult to understand how a grease spot on the floor can be accused of causing a boy or a workman to fall any more than an automobile can be blamed for causing the usual collision. What we should be most interested in knowing is *Why was the floor slippery?* or *Why was the tool dull or defective?*

Suppose that a boy cuts his finger while working on the band saw, and upon investigation we find that basically the accident was probably the result of his using a dull saw. If the accident is classified under machines, we will know nothing which will help us take future preventive action. If, however, the accident is classified under some such title as "faulty maintenance or supervision" then some definite course of action is open to us in the future.

Suggested Revision in Classifying Accidents

We should not stop classifying accidents by types because it is valuable to know how many accidents have been falls, cuts, burns, machine accidents, and the like, just as in industry, it is important to know the seriousness of accidents, the time lost, and the cost of accidents. I feel, however, that it is important to know the cause of the accident itself as distinguished from the cause of the injury.

A procedure, such as that described herein, if followed conscientiously, will tend to result in better safety records and consequently in better safety education.

1. Obtain the complete story of each accident as soon after it has happened as possible, so that the actual cause may be readily determined.
2. Make a list of the basic causes of accidents in your occupation such as lack of supervision, defective tools, anger, horseplay, and the like.
3. Find the cause of an accident in accordance with this classification.
4. Give the cause of the accidents studied the proper publicity.
5. Set out to eliminate these causes.

Following such a procedure will furnish adequate data for an effective program of safety education in our shops. Strictly speaking, we must admit that there is no such thing as an accident because the things we call accidents are, in the final analysis, merely the working out of the law of cause and effect.

Accident Proneness

A great many supervisors in industry and many of our shop instructors believe that accidents are usually due to outside physical causes. They regard accidents as an inevitable and a natural part of the job, but most of us know that there are also mental causes of accidents. Lack of foresight, for example, in doing things without consideration of the consequences. Nervousness, anger, irritation, inattention or wool gathering, slow mental and physical reactions, and worry are all factors that tend to develop accident proneness in employees. Workers differ considerably in accident susceptibility. In fact, a frequency curve in most ship groups would probably tend to show that the bulk of the accidents in any group is sustained by a relatively small number of the individuals in that group.

Those entrusted with the responsibility of safety education, should assume the full responsibility of their jobs, and they must dig below the surface causes of the accident in order to determine the true and avoidable cause of each accident.

GLOSSARY

To Be Inserted in All Books of Pedagogy

Professional — Using big words about small matters.

Philosophy — A smoke screen behind which we hide our ignorance.

Curriculum — What teachers spend so much time making they never get around to using.

Evaluation — What we think of what we do — from boast to boast.

Activity Program — The pupils go round and round.

Open-Minded — Convictions go out as fast as they came in.

Technique — The way we'd accomplish what we did — if we did anything.

—*Effa E. Preston, New Brunswick Teachers' Club News*

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION
J. J. Metz, Editor

The New Shop Student

The end of the first semester is fast approaching. Before long, new classes will be assigned to the school shops the country over. To many of the boys assigned, this will be their first entrance into the field of shopwork. It is important, therefore, that their high expectations be fully met by the appearance of the room when they enter, by the manner in which they are received, by the teacher's introductory talk, and by his first assignment.

To make all of this come true, the first thing to be considered by the teacher, then, is to make the room attractive. Attractiveness is a relative term. The school shop need not resemble other classrooms at all to be attractive. As a matter of fact, the entering student expects the school shop to be unlike other classrooms, and he ought not to be disappointed. If he were asked what he expected to see in the school shop, he would probably say that he expected to see a shop such as is found in his home community — shops like those used by carpenters, plumbers, painters, patternmakers, machinists, auto mechanics, implement repairmen, blacksmiths, and the like. The students usually have some notion of what a shop looks like, and they expect the school shop to be something like their mental concept.

It is true, there must necessarily be quite a difference between a school shop and the industrial shop, yet there should be a great similarity, too, Both of them are equipped to enable those who work in them to perform certain types of work. Both kinds of shops must typify the activity that is to be carried on in them. There must be orderliness in the way the equipment is arranged. Small tools and material must be accessible. There must be cleanliness and an appearance of workmanlike efficiency.

Of course, there are many poorly arranged and equipped industrial shops. There are some in which it is next to impossible to carry on work efficiently. There also are school shops of which the same may be said. Both types need thorough revision and overhauling to be brought up to date. Each teacher, therefore, ought to ask himself the questions "How well is my shop arranged for doing efficient work? What can be done to improve the present arrangement?"

Many will at once advance the argument "It takes money to rearrange my shop, and money is something I can't get at present." This may be true, but careful study may suggest changes which will not require money but which will, nevertheless, increase efficiency at least to some extent. Even a small improvement is better than none.

After the teacher has studied his shop for possible improvements, with the object of making it attractive to the new incoming student, he may well spend a few minutes in sober reflection of his own mannerisms when receiving the new student. Everyone knows how it feels to be received by a stranger in a cold and unfriendly way. Why then subject the student to this type of reception? There is a great difference between the make-believe, almost gushing, friendliness affected by some teachers and real friendliness. The student should be attracted rather than repelled by the teacher's mental attitude toward newcomers, and that means that the teacher must strive for a genuine interest in the newcomer. The boy himself is a keen detector of the spurious kind. The teacher has but to remember that he is in the same position as a salesman who must sell his ware to a customer, to see the necessity of meeting the new student in an affable manner. Sitting at the desk, or attending to other details, without even looking at the new students entering the room will not convey a very warm feeling of welcome. Boys are sensitive creatures. It is well to make friends of them from the very start.

Then comes the introductory talk. This, too, can either help to set up the proper relationships between students and teacher, and between classmate and classmate for the coming semester, or it can do just the opposite. Much time and thought should be spent upon its preparation. There is so much to be said, it is true, but the newcomer can absorb only a small amount anyway, so it is well not to make the first dose too large.

Then comes the first assignment. The boy comes into the shop keyed up to do something. It is well to take advantage of this natural urge. Plan a definite job for the first day. The boy may expect much from his first contact with the shop. If he is disappointed the first day, it will be difficult to recapture his interest.

The first job must of necessity be simple, and it may, therefore, be very difficult to put much interest into it. For this very reason, the teacher must be prepared to relate the first job with all the work for which it is to serve as a foundation. In this way, the student at least is shown that there is a definite connection between that which he is asked to do and the thing which he would like to do, the very first moment.

The opening of the new semester is approaching. There is still time to prepare for it in such a manner that the new student may derive the greatest amount of good from his first contact with the school shop.

Notables Born in February

February is the month of birthdays of notable men. Every school commemorates the birthdays of Abraham Lincoln and George Washington in some manner. For this reason, the shop teacher frequently feels that it is unnecessary for him to make a special effort to recall these important days to the attention of his students. Every well-equipped shop has a bulletin board, however, and portraits, clippings from magazines, typewritten anecdotes, and the like, about these two favorite historic personages may well be displayed on this board during the month of February. They will not only prove interesting to the students, but the display material, if well chosen, will be informative and educational, broadening the mental horizons of the pupils who work in the shop.

But there are other interesting personages who claim February as the month of their birth. The names in the list which follows, were chosen as being especially interesting to the students working in shops in which industrial-arts and vocational-education subjects are taught. Among the historical personages, besides George Washington and Abraham Lincoln, the birthday of Thaddeus Kosciusko, Polish patriot and aide-

de-camp to Washington, may be pointed out. His birthday falls on February 17.

Among the scientists and inventors born in February, the following may be mentioned: Thomas Alva Edison, our own great genius, who was born February 11, 1847. Galileo Galilei, the noted Italian astronomer and mathematician, was born February 15, 1564. On the same day of the month, but in the year 1809, Cyrus Hall McCormick, America's inventor of the reaper, was born. Alessandro Volta, Italian physicist and inventor, was born on February 18, 1745. Nikolaus Copernicus, Polish, born on February 19, 1473, may be titled the founder of modern astronomy.

The printers will be interested in the fact that one of their men also appears on the roster of notables born in February. This is Giambattista Bodoni, Italian printer, who was born February 16, 1740.

It may be new to most shop students that the national boy hero, William Frederick Cody, commonly known as "Buffalo Bill," also belongs to the great men who were born in February. His birthday falls on the 26th.

As already mentioned, portraits, clippings, and notes about one or more of those mentioned may be placed on the bulletin board. Better still, an assignment may be given to a number of students to look up something about the lives of some of those mentioned and then to make a report to the class at a future time. This will help to correlate or integrate the work of the classes in history and English with that done in the school shop. At the same time, the inspiration drawn from even a brief study of the lives of most of the men mentioned may help develop in the students the virtues of fortitude, perseverance, ambition, and willingness to sacrifice for principle's sake, which these men displayed so abundantly.

The Influence of a Good Teacher

Recently, Charles Bishop Hayes, field director of the American Foundation for the Blind, died in Milwaukee. It was largely due to his efforts that the education of the blind was thoroughly reformed.

He had spent several years as teacher and social worker before he was appointed commissioner for the blind in Massachusetts. After studying the problem carefully, he saw the need of improving many phases of the education of the blind as then given. Through his efforts, courses in this field were organized at Columbia, Harvard, and the University of Pennsylvania.

Up to that time, the blind were treated more or less as unfortunates whose fate could be alleviated to some extent, but who could not hope to be more than partially self-sustaining. Hayes, however, tried to advance the idea that those born blind, though deprived of normal eyesight, nevertheless, have sight of a different kind. He insisted that these unfortunates be brought up with the idea of developing the senses which they possessed to such an extent as to compensate for the one which they did not have. He even held out hope to those who lost their sight later in life. He contended that even these can be trained so that they can make their lives very much worth while to themselves and to others. Due to his energy and perseverance, many blind persons are today leading useful and happy lives.

Every teacher has the opportunities of which Hayes made such splendid use. Every teacher has the chance to project his aims and ideals into the lives of the students who come to his classes. While the impress produced on the world may not be so outstanding as was the case with the work accomplished by Hayes, nevertheless, every teacher does leave his impress on many, and through these that impress is carried to others, thus pyramiding the original imprint produced. Viewed in this way, the work of the teacher is fraught with great responsibility. Not only is he responsible for his own actions, but also for the actions of many others who have been directly or indirectly influenced by him. Truly a thought that should make the teacher pause and ponder before appearing before his classes without carefully thinking through all of the ramifications which may affect the lives and characters of his students.

As Hayes gave eyes and hope to the blind, so the shop teacher can give direction to and develop reliance and ambition in his students. However, this will happen only if the shop teacher, like Hayes, sees his opportunities, and strives to take full advantage of them.

Professional Improvement

Recently the writer was told of a shop teacher in a certain city who had been slated to fill a vacancy that had occurred. It would have been a fine promotion for the man and he deserved it because he took interest in his work and did an excellent job of teaching.

The school board of that city, however, has a ruling that promotions may be given only to those who have acquired advanced professional standing by attending summer school, late afternoon, or evening-school classes, taking extension work, and the like.

This teacher had failed to do this. He, therefore, did not get the promotion. Naturally he felt keenly that he missed so good an opportunity and reasoned that the action of the board was shortsighted in view of the fact that his work was admittedly as good or better than most of the other shop teachers in the system.

There are many other good shop teachers like him. They should not forget that exceptions to generally accepted rules are made only in exceptional cases.

Frequently, teachers who are expert in certain work, teach during the summer-school sessions, some at camps, others at vacation schools, some even at teacher-training institutions. This is fine, but it does not give advanced standing to the individual who is lacking educational requirements for a degree.

The upgrading of the teaching profession is in full progress. Many shop teachers are far-sighted enough to work for bachelor, master, and even doctoral degrees. This trend may not be overlooked, and the shop teacher who has his best interests at heart will not overlook the necessity of planning to acquire additional educational credits.

In the article entitled "Top Men Wanted!," by Joseph Bird, in this issue, the point is made that business and industry are ever on the lookout for outstanding men. The field of education also is casting about for leaders, but before anyone can even be considered in the realm of education, he must have the proper credentials. When these are secured, and not before, the road to advancement is open.

I Want to be a Printer

Harold H. Kirk

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A talk with the student who is taking up the subject of printing.

Many boys think they can become printers in a comparatively short time. In order to disabuse these boys and to guide them deeper into the subject of printing so that they will understand it better, the material herewith presented is given them early in the term in the form of a talk with the student who is taking up the subject of printing. During the class period, many more questions and interruptions will be made by the newer boys than are indicated, and, probably, two or more days may be used in covering the discussion — depending upon the interest, intelligence, and the size of the shop group.

Few stories of industrial history are more interesting than that of the rise and development of the art of printing. This business of pressing inked pieces of metal called type against paper is the process of multiple reproduction, and results in preserving the thoughts and statements of others. Of the total value of the product, printing ranks eighth among other industries. By further comparison with other trades, it will be noted that in number of establishments, printing ranks second; in the number of salaried employees it is first, and in the salaries paid it is first.

Throughout the entire printing field, there is the requirement for accuracy. This includes spelling, expression, punctuation, paragraphing, and all the other ways of doing the job without errors. This means in our English, science, art, and arithmetic, we must be careful, correct, and accurate.

It means further that we must have good eyesight, for the boy entering the printing trade has to use his eyes and hands constantly to be accurate. The printer with poor eyes can't keep up the speed that is needed to hold a job, and his work will be full of errors, careless mistakes he couldn't see because of tired eyes.

The individual who succeeds in any one of the many branches of the printing trade must be word-minded; that is, he must be able to carry his thoughts in the form of words definitely and correctly expressed. If he is a proofreader, he must catch the errors of others; if a pressman, he must see that the type forms carrying the thoughts, are printed clearly so as to reveal accurately the intended message on the finished page.

Another character trait required by the printer is that of co-operativeness. The boy who likes to have his own way all the time has no place in printing, for so many different persons go to make up a complete printing job, that each must understand and sympathize with the problems and wishes of others.

That is why here in our printshop we speak so much of co-operation, the working together in groups on your projects. In the printshop there isn't time for one to carry through to completion each job started.

In Benjamin Franklin's day, all the type was set by hand, the proof was pulled, read and corrected by the typesetter. He had to ink and oil the press, cut the paper and feed it into the press. If it was a book, likely it was bound by the same person. As recently as the beginning of the twentieth century, the printing industry was essentially a business of small establishments, usually one-man shops.

When one says he wants to be a printer, it may mean learning the specific skills of any one of 45 to 50 phases of the industry. If one wishes to be a typesetter or compositor, it does not mean the same now as it did forty years ago. Before typesetting machines* came into use, printing was composed by hand. Today the hand compositor, except in small shops, works only on jobs requiring special type arrangements such as ads, title pages of books, letterheads, and other similar jobs which can't be done well on the linotype.

So you see, when you say you wish to become a printer, it may mean you wish to learn any one of the many skills. If you wish to be a pressman, it will mean learning all presses. That is, if you wish to feed a platen job press, you must learn about their sizes, how to operate automatic feeders, and on which type of press a given job can be printed to the best advantage. You must know inks and how to mix them, which to use on the many kinds and weights of paper. Further, you must know paper, and there are hundreds of qualities and weights from which to select. The prices of these numerous papers must be known and studied, too. Press feeding is more than just feeding a sheet of paper into the press as we do here in the shop for practice and experience. Not to discourage you, but printing can't be acquired in the few weeks we are in the school printshop.

The question of wages earned by printers involves many angles. First, when you speak of a printer's salary, of which job are you speaking? The linotype operator gets $48 to $55 for a 44- to 48-hour week. Hand compositors usually do not earn quite so much. Pressmen, stonemen, proofreaders, and binderymen, all make good wages, but the scale of wages is set by the trade union and varies a little in each city. We can say, however, that the printing industry is one of the most stable; that is, there is no great turnover of men. If one is a good workman, he will likely keep a job over a long period of years. The days of the wandering-tramp printer are just about over.

Apprentices earn from $12.50 to $15 per week at the start of the four- or five-year apprenticeship, and their wages rise to almost the journeyman level before the final examination which ends the apprenticeship. Of course, boys who do not sign an agreement to work for a period of four or five years, are not apprentices. Such boys, if they do get a job in a printshop, will be hired as printer's devil or errand boys. Their pay would accordingly be very low.

Since general education is so important to the printer, boys should not drop out of school at the end of the ninth grade with the idea that they can step into *any* trade. Printers want apprentices who have a good grounding in English, science, geography, civics, history, art, arithmetic, and in school shopwork. A skilled trade to a great extent is based upon what one learns in the subjects offered in school. But, whatever the beginner's background, promotion in any job will depend to a great extent on the interest shown by the willingness to work exhibited and by the general conduct in the shop while on the job.

In the binderies, we find many girls and women employed. The turnover among them is greater due to marriage and various social reasons. The salaries are not so high as with the jobs on the power machines. The hazards, too, are less, especially in the smaller bindery. Some small shops are still poorly lighted, otherwise the healthfulness of the printing trade is above the average for other trades.

Promotion in the printing industry depends upon the individual to a very great extent. He is judged upon his practical experience, his general education, and his technical training. Promotion comes to those who prepare for definite skills and responsibilities.

*Typesetting and casting machines invented and perfected during the past forty years are: The linotype, intertype, linograph, Ludlow, and the Elrod.

Industrial Arts for the Handicapped

Harry M. Dexter

Central High School,
Grand Rapids, Michigan

An address by the writer given at the teachers convention, October, 1937, at Grand Rapids, Michigan.

The writer has always felt that it was quite fortunate that his first call permitted him to teach metal work in a private school. Many of the students in that school belonged to the class of the handicapped. Some were mentally and others physically deficient.

In classifying the mentally deficient, one can look upon the human brains somewhat as though they were containers, and like containers, some brains are good, some not so good, and a few are very deficient. The best brains, like good containers, are those that have wide entrances and good leakproof bottoms. A person with a mind like that learns easily and does not lose nor forget what he has learned. His brains, or his mind containers, one might say, are perfect.

Next, we have those whose brains have small entrances but good bottoms. Such persons learn or understand with difficulty. They must constantly receive repeated explanations and demonstrations. But if they once understand, they will not easily forget. Persons having this type of brain may improve it with practice. In time they may enlarge the small entrance to their brains. Such pupils are worthy material to work with and on, and in time, they may become as good as the best.

Then there are others who have mind containers with wide open entrances, but very leaky bottoms. This type understand readily, but, failing to retain what they have seen or heard, they forget soon.

Next are those who learn with great difficulty and hardship, but who forget what they have learned in a very short time. They have brain containers that are constricted at the inlet and the bottoms are leaky. They can receive very little and very slowly, but that which has entered, is quickly dissipated.

There are many other types of pupils with as many different kinds of brains, but no matter what the case, or how difficult it may seem, if the general-shop instructors are willing to tackle the job, these handicapped pupils will, in almost every case, benefit through their efforts, and their hard labor will not be spent in vain. Care must be exercised, however, to give each case the treatment it requires.

In the next category come the physically handicapped, namely, the blind, the deaf, and the crippled. Any one of these will greatly benefit from the general shop at school if it is in the hands of an ever-ready, helpful, friendly teacher.

During this semester, I have been trying to give real trade training to deaf-mutes. It seems that when an individual has been robbed by Nature of one or the other sense, the remaining senses develop more acutely. This is especially true of the boys who are deaf. Many of them are exceptionally intelligent and a goodly number of them are very handy with tools and machines.

There are four of these boys in my classes for half days daily, and I am grouping them together with normal boys. The deaf boy gets accustomed to being with the normal boys and to having them talk to him, using trade terms, names of tools and machines, also names of processes such as soldering, brazing, spinning, riveting, seaming, and the like. The normal boy who becomes accustomed to the speech sounds of the deaf boy and understands just what he wants to do, but cannot say, also is gaining by this experience.

My aim is to teach these deaf boys to become first-class metal-workers. Then they may be placed in paying jobs. To reach this goal will take about two years.

Then there are the crippled and disabled boys and girls who come to class with crutches and wheel chairs. These children come into the shop with a smile. They are forgetting their troubles. They are anxious to begin work and to carry out some worth-while project. These children must be given special and individual attention. The class must be limited to between six and twelve — it all depends upon their sex and the extent of the pupils' ability to move about from one place to another, and also to what limit they can use one or both of their hands. But, whatever the case may be, if the teacher tries he is sure to be rewarded with results.

Probably it would be helpful if I explained how I go about this work. Before I am to meet such a class, I make a study of what projects could be made by pupils with fingers that are disabled, or missing from one or both hands. Next, the work for the pupils who come on crutches or in wheel chairs must be planned. Then, just before meeting the class, I pick out from my own models five or six attractive but simply made articles such as small bowls, ash trays, cigarette and jewelry boxes, small vases, sugar spoons, letter openers, or book ends.

At the beginning of the class, I try to make the meeting very pleasant and to become personally acquainted with each student. While doing this, I try to discover just what the individual's handicap is so that I can determine which article would be best for each one to start with, for every student must be set to work on something which he will be able to make and to complete in a comparatively short time. Those using only one crutch are not so difficult to put to work. Those who are in wheel chairs may be put to work at bench, vise, or raising blocks, with their right sides toward their work. I find it possible for them to do their work in this position without much difficulty.

One poor boy in a wheel chair who could bend neither right nor left, was provided with a drawing board which fitted across the arms of his wheel chair. He was then given some repoussé work, together with a model of what he was to make. He did that work so carefully and became so interested that I had to stay with him in the shop until it was time for him to return to his room and go to bed.

Another class of pupils which I consider as handicapped as any of those just mentioned, are the so-called incorrigibles, the ones that give the academic teachers so much trouble. These and the mentally deficient are known as the hopeless cases, but up to the present, I have not as yet met any boy whom I could not forge into an agreeable worker. There is no secret method employed in accomplishing this. The first thing the teacher must do is to prove that he is the boy's real friend. He must not scold the pupil for doing poor work. Instead, he must look for the best points in the work, and give them some measure of praise and then point out improvements here and there. If this is done, there will be no hopeless cases, but this approach requires utmost tact and inexhaustible patience. With it, every type of pupil can be improved to the level where he will become at least a fairly desirable member of society and a breadwinner.

Nothing great was ever achieved without enthusiasm. — *Emerson.*

The vocation of every man and woman is to serve other people. — *Tolstoi.*

How to Run a Chess Club

R. R. Bedker

Longfellow Junior High School,
Wauwatosa, Wisconsin

A fine hobby-club subject. Chess has intrigued many—it will interest many more.

Chess is the king of games, and the game of kings. Chess is not, as many people think, a difficult game to learn. The game can be enjoyed from the beginning and the possibilities involved create a pleasant situation from the start. Chess is a quiet game — a good tonic for our nervous systems.

As in any sport, there are a few outstanding players, but the majority of the chess players are of the type that play golf and occasionally break a hundred.

The cost of playing chess is small. A complete outfit for a beginner can be purchased for one dollar at any department store.

Chess players are now speeding up the game by playing rapid-transit style. This does away with the three- and four-hour games. A good game can be played in thirty minutes.

Joining the Chess Club

The only requirements for joining any of the chess clubs are an active interest in chess and the payment of dues. Indigent members are excused from paying dues. Members are expected to help with club programs, tournaments, exhibitions, and take an active part in the final tournament.

The membership of the beginners' club will be limited to those who have not previously been members of a chess club. Players will be unranked when they enter the club, but may achieve a *B* rating by passing certain tests.

Players who attain a *B* rating may join the intermediate club, and upon qualifying, may attain an *A* rating, enabling them to join the advanced club the following semester.

Members of the advanced club who pass the test may receive an *AA* rating and certificate. Those who continue in the club may receive an *AAA* rating for special merit.

Membership in each club shall require the payment of dues which will not exceed fifteen cents per semester. The dues will be used to purchase medals for the winners of tournaments. In clubs having 15 to 25 members, two medals will be awarded, and where the number of members exceed 25, three medals will be granted. Any money remaining after the purchase of medals will be refunded.

It is the present plan to obtain an honor plaque which will remain as a permanent trophy on which the name of the winner of the school championship will be engraved each semester.

As an added feature, it is planned to stage a series of matches with chess experts who will play against several school players at a time.

Election of Officers

A president, a vice-president, a secretary, and a treasurer are elected at the first meeting so that regular programs may be started the second meeting.

Before the election, the sponsor stresses the point of electing capable officers, not only capable people, but boys capable and willing to devote time after school in preparing chess schedules, tournaments, regular programs, and meetings.

The president has charge of the club with the aid of the sponsor. The strength of the president determines the number of responsibilities which can be turned over to him. If the president is weak, then the sponsor will have to assume more responsibilities.

The vice-president is expected to take charge of every third or fourth meeting, and all meetings from which the president is absent.

The secretary should have a legible handwriting and be capable of taking brief notes and transcribing them into interesting minutes. He should be accurate in reporting the results of all games played.

The treasurer should be honest and capable of doing simple bookkeeping. There should be a check on the treasurer with an auditing committee.

The committees are formed by the sponsor and the officers. It is necessary to get willing, capable people on committees. There is need for a prize committee, a weekly play committee, a "Can You Solve It" committee, and a final tournament committee. It is well to have an occasional check so that the committees are kept at a high point of efficiency.

Starting the Meeting

Start promptly. Make the formal part (minutes, notices, and the like) as brief as possible because club members do not enjoy dull notices from the president, secretary, or committees. Make every member feel his responsibility for making the work of the club successful.

A successful club depends upon hard-working officers, an interested, active sponsor, and meetings that captivate and hold the interest of the members. Many clubs are unsuccessful because they follow the lines of least resistance. They do things that should work but don't.

Chess-Club Objectives

The sponsor should have a meeting with the officers directly after the election. At this meeting the objectives of the club for the semester are discussed, and a program for the next week is planned. The tentative objectives which follow, may be presented to the club for approval. This gives a foundation to work on.

1. To conduct the club in a business-like way. (Officers, etc.)
2. To promote neighborhood chess playing.
3. To teach the fundamentals of chess play.
4. To promote chess play as a hobby.
5. To get good speakers for the club.
6. To encourage everyone to play chess with different people.
7. To give everyone an opportunity to appear on a program.
8. To make a survey of all the chess players in the school.
9. To make a chess-players directory for the school.
10. To give chess publicity to the newspapers. (School paper and local paper.)
11. To promote general interest in chess playing through the bulletin board. (Illustrated games.)
12. To promote fair play and good sportsmanship in all our chess playing.
13. To send for chess information.
14. To encourage school and local libraries to get chess books and magazines.
15. To promote the reading of chess magazines in the library.
16. To enter current hobby shows with chess exhibits.
17. To enter current chess tournaments.
18. To promote a final chess tournament.

This is only a check list of some of the objectives for chess clubs. Select the ones you can use for your particular club. Add new ones, if necessary.

Getting Outside Help

Get some adult chess players to speak before the club. If possible, have them give a chess demonstration. Write a column in your local paper for help. Chess clubs in large cities may probably get help from their Recreational Departments.

Planning Programs

At the first meeting of the officers, plan the program for the next meeting. Make a general tentative outline for the whole semester and revise it when necessary.

A typical program is as follows:

1. Meeting called to order.
2. Roll call by secretary.
3. Secretary reads minutes. (Minutes include winners and losers of all games.)
4. Discussion of old business.
5. New business.
6. Report on some phase in chess.
7. Report on problem-solving game.
8. Playing a game of chess.
9. Announcement of next week's program.
10. Adjournment.
11. Informal chess playing and finishing of chess games.

Some Things a Chess Club Can Do

Chess-Club Directory. Make a list of all club members with their addresses and telephone numbers. Make copies for all members.

Chess News Sheet. Have someone in the club write up the activities in popular style and give the members a copy of these notes once a month.

Chess Magazines and Books. Encourage the school and local libraries to put more magazines and books on their shelves. Help them get books that are of the proper age level for the members.

Chess News in Papers. Have your club reporter write up some interesting articles for your school and local papers.

Chess Medals. Special bronze chess medals with different colored ribbons may be obtained at a fair price from various firms specializing in this type of material. Printed ribbons also make nice chess awards.

Chess Demonstrations. Have some expert come to your club and give demonstrations. Some of the better playing experts can play against 10 to 30 people at one time.

Neighbor Chess Playing. The chess players in any neighborhood can form an informal chess-playing group.

Teaching Dad to Play Chess. Here is an opportunity for father and son to become better acquainted. It is really a sociable game.

Chess Clubs for Girls. The girls also should be permitted to form a club. In places where it has been tried, the girls show an active interest in the game.

Weekly Problem Solving. A special chess board and men are put on the bulletin board. A checkmate is demanded in one, two, or three moves. The contestants write their answers and hand them to the committee. The winner receives a prize.

Chess Acting. We have never tried it but in some places chess is played with human beings dressed like chess pieces on a large chess board on the grass or sand.

Chess Testing. Give tests at the beginning and end of the semester and find out if your group knows the fundamentals of chess. A sample test is present in this article.

What I Like About Chess. Have every member write a statement on this title. This will give the sponsor some clues in running the chess club.

Illustrating Plays. Use the opaque lantern for variety. A special demonstration chess board and men should be used in showing members how to play.

Rapid-Transit Chess. Rapid-transit play speeds up the game. The player must move immediately when it is his turn. This tests mental alertness.

Experts at Chess. Don't try to make an expert out of every member. Most people enjoy "just playing the game."

National Geographic Magazine, May, 1931. The issue of the *National Geographic* mentioned in the foregoing has an interesting article on how Strobeck, Germany, goes in for chess in a civic way. They play chess in schools.

Chess Awards. We have been giving a chess medal to the winners of each group. The winners of each group play in the finals to determine the first, second, third, etc., medal or ribbon awards.

Chess Set for Bulletin Board. Take a regular ten-cent chess board, which is the same as in checkers, and put a small hole in the center of each square. See Figure 1. A sharp nail or an ice pick worked on top of an old board will do the trick. Now fasten the board with small nails on the bulletin board. Next drive a 1-in. brad in the bottom of each chess piece so that about ½ in. is sticking out. Clip off the heads of the brads at an angle. The chess pieces can now be put in the holes on the chess board to illustrate games. The device can be used for a chess problem-solving contest. It is a very useful device.

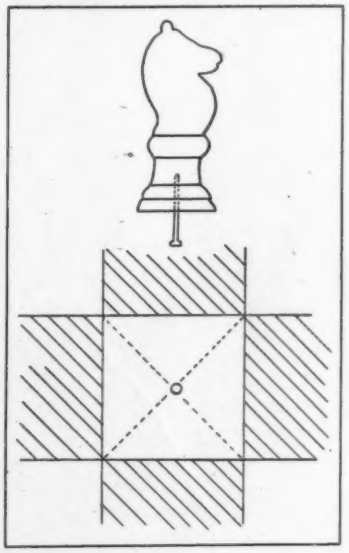

Fig. 1

The cost of chess sets varies from 75 cents to $25. Most persons buy a $1 or a $2 set. The board costs from 10 cents to 50 cents. There are special inlaid boards from $3 to $5.

A club sponsor should have at least one good chess magazine such as the *American Chess Bulletin* (monthly), published by Hermann Helms, 150 Nassau Street, New York City, or the *Chess Review* (monthly), Israel A. Horowitz, Editor, 60–10 Roosevelt Ave., Woodside, N. Y.

There are many good books on chess. The editor of the *Chess Review* will be glad to send a complete list of American and foreign chess books that will meet individual needs.

A series of interesting chess lessons, at 25 cents, each may be obtained from Mr. Fred Reinfeld, 2265 Newbold Avenue, New York City. Mr. Reinfeld also is very willing to answer personal problems of sponsors.

Moves of Chess Pieces

The King

1. The piece of most value.
2. When checkmated, the game ends.
3. Moves only one square at a time.
4. May move in any direction.
5. May be blocked.
6. May capture pieces.
7. May not check king with king.
8. May castle with rook.
9. Checkmated when it is impossible to move out of check.
10. May not be captured.

NOTE: Chess pieces capture by landing on the square of captured piece, not by jumping as in checkers.

The Queen

1. The most powerful of all pieces.
2. May move any number of squares.
3. May move in any direction except move of knight.
4. Has capturing power.
5. May be blocked.

The Knight

1. The knight's move is a leap or jump.
2. The jump is at right angles two up and one over or one up and two over in any direction.
3. The knight may jump over pieces.
4. The knight captures by landing on the square of the captured piece.
5. The knight may be blocked by one of its own men by being on a landing square.
6. The knight may check a king.
7. The knight covers eight squares at certain times.
8. It is impossible to checkmate a king with two knights and a king.

Group 1	J. Brown	R. Smith	H. Green	W. Jones	E. Hare		
J. Brown	X	W	D	L	W		2½
R. Smith	L	X	W	W	L		2
H. Green	D	L	X	W	D		2
W. Jones	W	L	L	X	W		2
E. Hare	L	W	D	L	X		1½

J. Brown (Winner)

Group 2	M. Lloyd	H. Moore	I. Lawe	E. Burk	A. Gibbs		
M. Lloyd	X	L	W	W	W		3
H. Moore	W	X	L	D	L		1½
I. Lawe	L	W	X	L	W		2
E. Burk	L	D	W	X	W		2½
A. Gibbs	L	W	L	L	X		1

M. Lloyd (Winner)

Group 3	P. Larre	R. Black	E. Berg	L. Flynn	H. Ward		
P. Larre	X	L	D	W	W		2½
R. Black	W	X	L	W	L		2
E. Berg	D	W	X	W	D		3
L. Flynn	L	L	L	X	W		1
H. Ward	L	W	D	L	X		1½

E. Berg (Winner)

Group 4	W. Thiel	O. Lewis	J. Ford	R. Miles	E. West		
W. Thiel	X	W	D	W	L		2½
O. Lewis	L	X	W	W	W		3
J. Ford	D	L	X	L	L		½
R. Miles	L	L	W	X	W		2
E. West	W	L	W	L	X		2

O. Lewis (Winner)

Finals	J. Brown	M. Lloyd	E. Berg	O. Lewis			
J. Brown	X	L	D	L			½
M. Lloyd	W	X	L	L			1
E. Berg	D	W	X	L			1½
O. Lewis	W	W	W	X			3

O. Lewis (Winner)

The Bishop

1. Each side has a white and a black bishop on his color.
2. The bishop moves diagonally.
3. He may move backward and forward on his diagonal.
4. He may capture any man except the king.
5. The bishop has no power outside of his diagonal.
6. If the bishop is blocked it cannot move until the blocking piece is moved or taken.

The Rook or Castle

1. The rook moves straight from the square it occupies to the right or left or straight forward or backward.
2. It may capture any piece except the king.
3. The rook may castle with a king once in a game.
4. If the rook is blocked, it may not move until the blocking piece is moved or taken.

The Pawn

1. The pawn moves straight ahead.
2. The first time it moves, it may go forward one or two squares according to the player's choice.
3. After the first move, it may move only one square at a time.
4. If it succeeds in reaching the eighth rank, it is usually queened or player's choice.
5. If there is a piece on the square in front of the pawn, the pawn is blocked until the blocking piece is removed.
6. The pawn has capturing power.
7. The pawn captures only diagonally.
8. It may not move backward or sidewise.
9. When a pawn on its first move passes opponent's pawn, it is called *en passant*. Only when it moves two spaces may it be taken if opponent chooses.

Castling

1. Only once during game.
2. Made to protect king.
3. Rook and king move (counts as one move).
4. There are two ways to castle: First, king moves to king's knight square, king's rook moves to king's bishop square; second, king moves to queen's bishop square, queen's rook moves to queen's square. Another way to consider it: King moves two squares to right or left, rook is placed on other side of king.

May Not Castle

1. If king has been moved.
2. If rook has been moved.
3. If there be any piece between the king and rook.
4. If the king pass over any space attacked by one of the opponent's pieces or pawns.
5. May not castle out of check.

How to Run a Chess Tournament

Players are arranged in groups by drawing group number out of hat.

The score cards shown illustrate how the scores are kept.

W = Won = 1 point
D = Draw = ½ point
L = Lost = 0 point

By making more squares, the groups can be larger. This method will work with an even or odd number of players.

How to Read Results

Group 1. Reading left to right for J. Brown's record:

Brown won from Smith
Brown got a "draw" from Green
Brown lost to Jones
Brown won from Hare

Brown is the winner because he has the most points (2½).

Ties are played off.

Chess Test

Put a plus (+) sign after the statement you think is correct, and a minus (—) sign after the statement you think is incorrect.

Pawn

1. The pawn may move backward. ( )
2. The pawn may move forward. ( )
3. The pawn may move diagonally when taking. ( )
4. The pawn may move diagonally when not taking. ( )
5. The pawn may move sidewise. ( )
6. The pawn may replace the king. ( )
7. The pawn may replace any man when reaching the eighth square. ( )
8. The pawn can replace any man except the king. ( )
9. There is but one pawn. ( )
10. There are eight pawns on one side of the board. ( )
11. The pawn is placed on the second square of the board. ( )
12. There are only two pawns. ( )

Rook

13. The rook is sometimes called a castle. ( )
14. The rook may move any way except diagonally. ( )
15. The rook may move diagonally. ( )
16. The rook may replace any man on the board. ( )
17. The rook may check the king diagonally. ( )
18. The rook may check the king in any other way except diagonally. ( )
19. There are two rooks on one side of the board. ( )
20. There is one rook on the board. ( )

Knight

21. The knight is often called a horse. ( )
22. The knight may move two straight and one to the side. ( )
23. The knight may move straight forward any number of squares. ( )
24. The knight may move one straight and one diagonal square. ( )

25. The knight may move diagonally for any distance. ( )
26. There are two knights on one side of the board. ( )
27. There is only one knight on the whole board. ( )
28. The king is in check when it is in line with the knight. ( )
29. When the king is on a square in which the knight may land in the next turn, it is in check. ( )
30. The knight lands on the opposite colored square from which it came. ( )

Bishop

31. The bishop moves diagonally any number of squares. ( )
32. There are two bishops. ( )
33. Both bishops are on the same-colored square. ( )
34. The right-hand bishop is always on the red square. ( )
35. The left-hand bishop is always on the black squares. ( )
36. Both bishops may turn corners. ( )
37. A bishop may check by being in a diagonal line with the king. ( )
38. Bishops may move straight forward. ( )
39. A bishop may replace any other man on the board. ( )
40. The bishops are placed next to the king and queen. ( )

Queen

41. The queen has two names. ( )
42. There are two queens on each side of the board. ( )
43. The queen may move any way and any number of squares. ( )
44. The queen may check when it is in line with the king. ( )
45. The queen is placed next to the king. ( )

King

46. The king may move any number of squares. ( )
47. The king may move only one square at a time. ( )
48. The king may be taken. ( )
49. The king may take other men. ( )
50. The king may be checked. ( )

Miscellaneous

51. The fools-mate is a joke about chess. ( )
52. The fools-mate is a trick in which to put the other man in check. ( )
53. One may castle when in check. ( )
54. One may castle when there is nothing in the way. ( )
55. In pawn-passing, a pawn is taken. ( )

Lessons for Young Workers—III

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The third of a series of suggestive lessons designed to help students of industrial arts and vocational education.

Do We Need a Boss?

Those who work in factories usually have someone from whom they take orders and to whom they are responsible for their behavior while they are at their place of employment. This individual is popularly known as the "boss." Many workers believe that the foreman is boss because he is the one who hires and fires them, and who forcibly remonstrates with them for any infraction of the factory rules. Some workers forget that the foreman has a boss also and that he must take orders from one who is higher than he. The foreman's boss is known as the superintendent and he deals with the foremen in the same fashion as the foremen do with the workers.

The story does not end here for we find that the general manager is boss over the superintendent, the directors of the company issue orders to the general manager, and the stockholders control the actions of the directors. The connection between these individuals is shown sometimes by a chart, similar to the one which follows. These charts vary in form with the size of the organization.

Under this arrangement, the men report to their foremen, all foremen report to the superintendent, the superintendent reports to the manager, the manager takes his orders from the directors, and the directors are governed by the stockholders.

All of these people must work together if the best results are to be obtained, just as a football team must work together if the players want to win their games. As a matter of fact, if you examine the chart, you will find that it is a simple matter to find more than one team in a factory set-up. Each line has its work to do, and if one fails to do its part, the chances of the team as a whole making its downs is lessened.

You will notice that each foreman is in charge of a team. You are a member of your foreman's team, and if you shirk your duty when you are called upon to act, your team suffers. If a football player shirks his share of the work, the coach soon displaces him with another player who is willing to play the game as it should be played. The same is true in the factory; when you shirk you are soon displaced by someone else.

If it should happen that the coach fails to notice the player shirk, the result on the team is just as bad. Similarly, if the foreman fails to see you shirk, do not feel that you are "getting away with something" — the result on the progress of your team is just the same. What the evil effects are will be taken up in another lesson; in the meantime, it is sufficient to know that:

1. You are a member of a team in your factory.
2. The permanence of your job depends on the effectiveness with which you and your teammates play the game.
3. You may "soldier" and not be caught, but you are a traitor to your team just the same.
4. If you are caught soldiering you may be fired.
5. Whether you are caught or not, you are reducing the gain made by your team.
6. In the football field or in the factory, real men play the game and do their share of the work cheerfully.

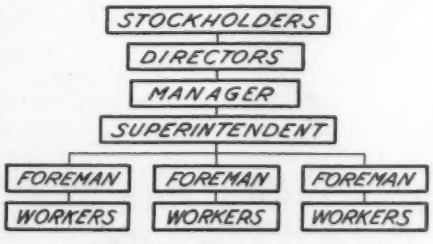


Diagram showing flow of authority

Questions for Discussion

1. In what ways may a foreman be compared to the captain of a football team?
2. What is likely to happen to a football player if he hangs back when the signal given indicates that the team is to go "through the line"?
3. Is the worker who leaves some of his work for his fellow workers to do, any different from the football player in question 2?
4. Has the manager of your factory any boss? Does he have to take orders from someone?
5. May your foreman do as he pleases? Who tells him what must be done and when it must be done?
6. Would a first-class team be successful without a coach? What is he needed for?
7. Do you know of anyone in your factory who might be compared with the football coach?
8. Who might be the quarterback in your shop?

Pushmobiles and Pushmobile Derbies

Armand J. La Berge

Minneapolis, Minnesota

An excellent leisure activity for boys in industrial-arts classes.

For the past sixteen years the Recreation Department of the Park Board of the city of Minneapolis, in co-operation with the *Minneapolis Tribune*, has conducted an annual Pushmobile Derby as a part of the summer recreational program. Although the Pushmobile Derby is a boy activity, we find many girls taking part in the event.

There are four classes of events, namely:

Class A. An Ornamental Contest. A contest in design and construction. The boys in the class must be fifteen years of age or under at the time of the final contest.

Class B. A Speed Contest. The boy pushers in this class must be fourteen or fifteen years of age.

Class C. A Speed Contest. The boy pushers in the class must be thirteen years of age or under at the time of the final contest. The pilots may be seven to thirteen years of age.

Class D. A Special Clown Event. This class is open to boys and girls of the city under sixteen years of age.

Pushmobile Construction Hints

Any kind of wheels may be used in a pushmobile. A double-disk roller-bearing wheel, however, is recommended on speed cars. Coaster-wagon wheels make excellent wheels for any type of pushmobile.

A pushmobile must not be less than 4½ ft. nor more than 7 ft. in length. A pushmobile should be 11 to 16 in. in width.

The pushmobiles must be the work of the boys themselves.

A boy may get help from the library or from an adult on the proportions and design of an ornamental or a speed car.

The special clown pushmobile may be constructed in any size or design. The pilots and pushers in this event are to dress as clowns.

The speed cars must be well constructed and made to look like racing cars. They must have a hood and a steering wheel.

The Preliminary and Final Contests

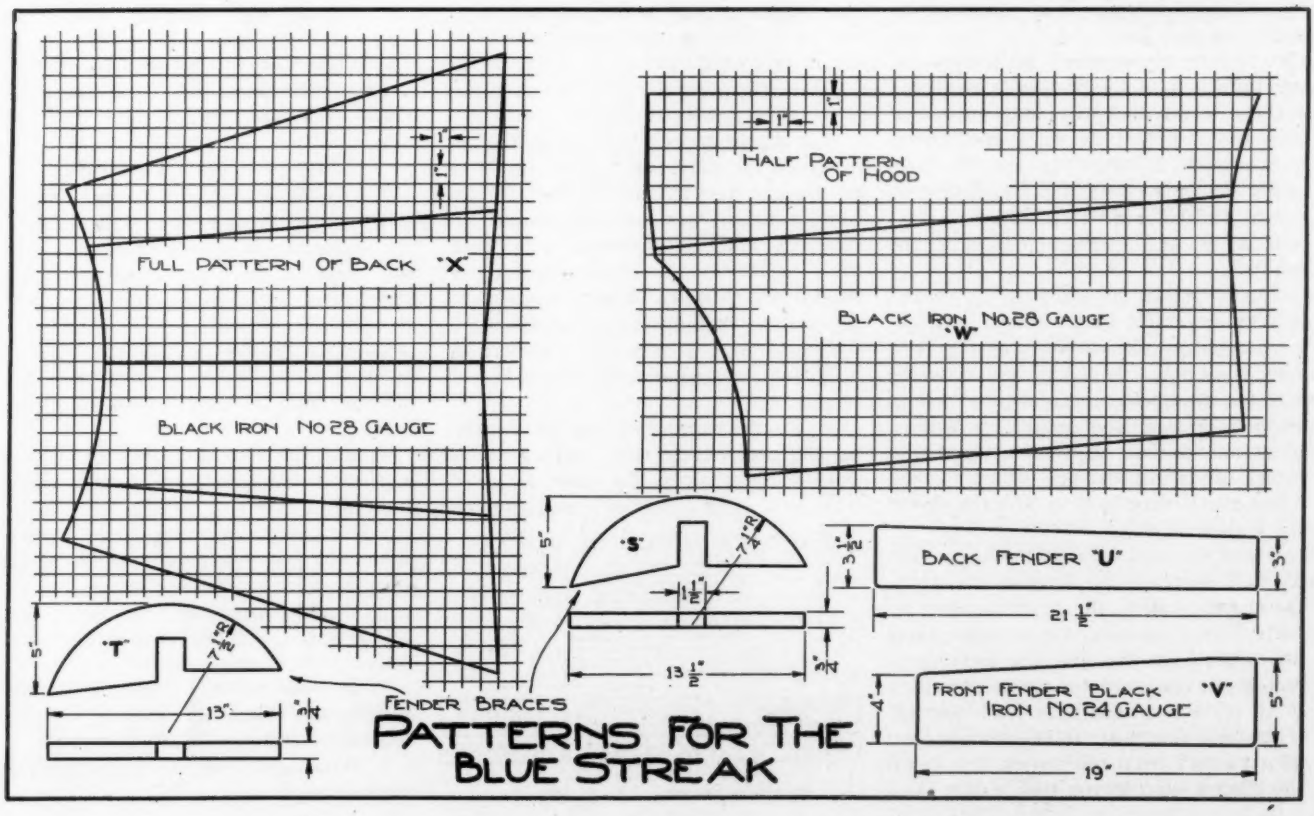
Preliminary contests are conducted at each playground (thirty-six playgrounds), the winners to represent the playground at the final meet held a week later. Each entry consists of a pilot and a pusher. All parks are entitled to two entries in each class in the finals. For every five entries, or fraction thereof, above the first five entries, each park is entitled to an additional pushmobile in the finals.

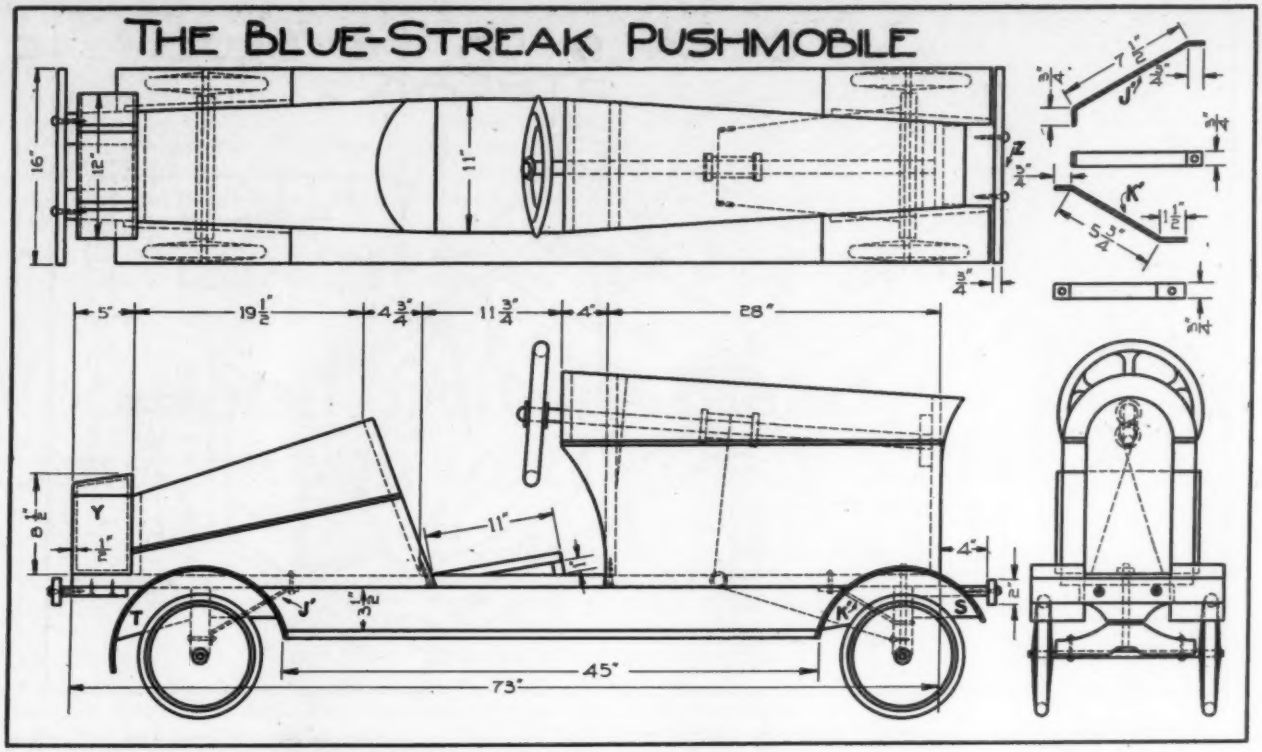
At our sixteenth annual preliminary contest this past year, there were three thousand boys and girls enjoying this fine leisure-time activity (fifteen hundred pushmobiles). In the grand final, five hundred boys and girls took part in the Derby with their classy pushmobiles. There were two hundred and fifty pushmobiles in the finals.

Some of the cars represented in the Derby were built in the school shops of the city schools during the school year, but the largest number of pushmobiles were built in the boys' own shops, back yards, or on the playgrounds.

A boy entering a pushmobile contest in Minneapolis spends from three to six weeks before the contest in preparing, designing, and building his car. One of the winners of the best constructed cars spent four months in building his "Landeau sedan."

The pushmobile activities, and other similar handicraft activities, such as kit construction, model sail and motorboard construction, model airplane construction, and contests are most excellent examples





of the "carry-over" of the many activities of the industrial-arts shops of the schools.

To develop an interest which will carry over and lead the boys to make use of their acquired manipulative skills during their leisure hours, especially during the long vacation periods, is an outstanding industrial-arts objective.

It is a generally accepted fact that character building is not done entirely between the four walls of an institution of learning, but most often during one's leisure time.

Crippled Children See Races and Ornamental Contest

At one of the preliminary contests, one park instructor conducted this pushmobile contests in front of the Shriners' Hospital for crippled children. There was a good turnout at the Shriners' home. Long before the entrants for the heats arrived, there was a buzz of excitement among the youthful patients (and, to no small extent, among the nurses and staff) because of the approaching event.

The pushmobile races and exhibitions meant a lot to those hoping to carry off honors which would enable them to compete in the finals the following Saturday; but the races and the beautiful cars meant a very, very great deal to the youngsters whose bodily troubles prevent them from witnessing many athletic events and taking part in boy-and-girl activities. It was a real treat for those boys and girls who were unable to leave their beds.

At thirty-five other parks, preliminary contests were conducted. Some parks drew from one thousand to five thousand spectators composed of interested mothers, fathers, sisters, brothers, friends, and fans.

On the day of the final races and contests in front of the Minneapolis Art Institute a week following the preliminaries, thousands of people flock to the course to see the five hundred boys and girls compete in the big pushmobile classic.

About the Art Institute, the hosts of boydom were gathering Saturday noon for the summer sports classic, the Park Board-Tribune Pushmobile Derby. Leading the army of youngsters that headed for the Institute, came the racers and beautifully constructed cars, five hundred boys and girls with their eyes fixed on victory and fame. Trooping along in their wake came the hundreds of their cohorts, squadrons and details from each park, prepared to cheer their comrades on to victory, or to console them in defeat.

But when they lined up for the start of the first race at 2.30 p.m., the crowd that banked itself along the sidewalks on Twenty-fourth Street was not composed entirely of boys and girls. Thousands of grown-up pushmobile fans were on hand for the running of the Derby.

Every year, the finals of the Pushmobile Derby draw thousands of persons to the speedway for an afternoon of thrills and upsets, of speed and competition. From all parts of the city they flocked to watch those boys and girls fight it out as only boys and girls can — with no rancor or hard feeling, but with all the energy and vigor at their command. There were ten thousand pushmobile fans this past year. The large crowd was kept back along the 100-yard roped course by a score of policemen.

The president of the park board and mayor of the city of Minneapolis were official starters, and what a busy afternoon they enjoyed!

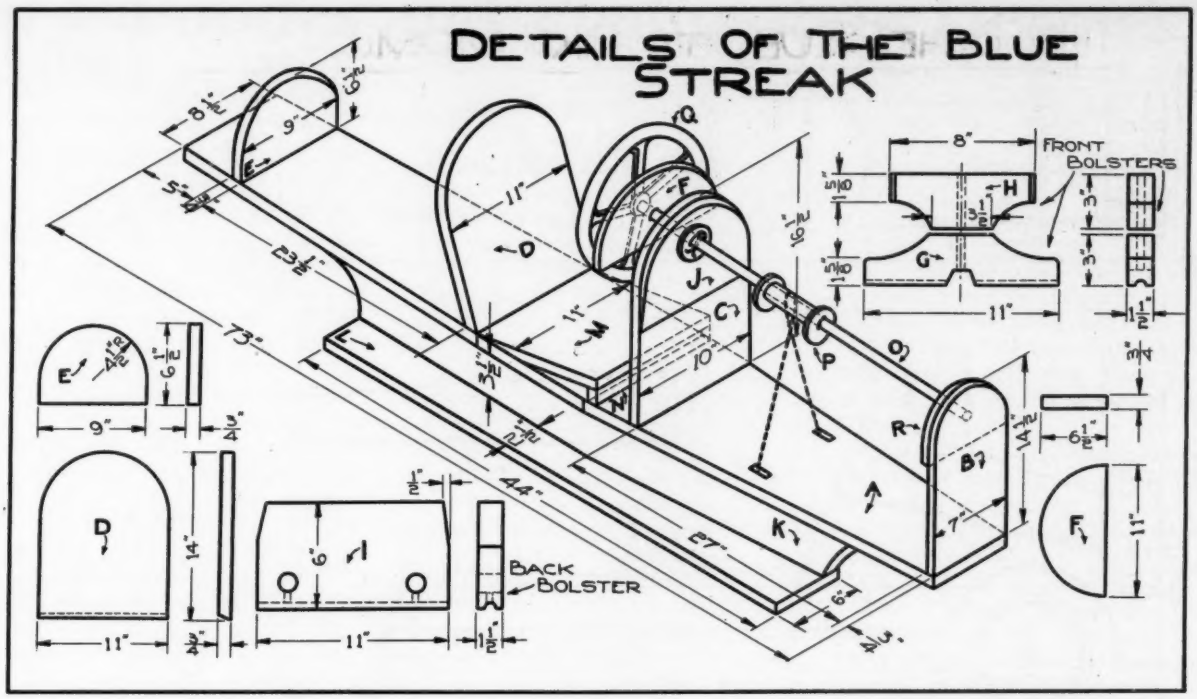
The prizes for the preliminary and final contests were donated by the *Minneapolis Tribune*. The first-place winner in the preliminary races won a pocket knife. The first-place winners (pilot and pusher) in each of the four classes in the finals were given fully equipped bicycles. The second-place winners received gold wristwatches. Many other valuable prizes were donated, down to the sixth-place winners in each class.

The "Blue Streak" Pushmobile

In the "Blue Streak" we have an up-to-date pushmobile.

The body designs and lines are continually changing in the boys' cars as well as those of Dad's automobile. Although there have been many changes in the pushmobile, the motive power remains the same and is still furnished by the pusher and his sturdy legs.

The combination of materials involved in the construction of the "Blue Streak" is very interesting and fascinating to the boy builder. There is nothing difficult about the construction of the car and it is well within the ability of eighth-grade pupils. A boy may use his own ingenuity in adding more accessories to his car, such as



headlights, motometer, windshield, brakes, etc.

The framework of the "Blue Streak" should be constructed of a soft, light wood, such as white pine, bass, or butternut. Instead of using metal for the hood and the back part of the car, one may use canvas.

Framework. The details given in the drawings show clearly how the different parts of the "Blue Streak" are made and assembled. Such parts as *B, C, D, E, F, S,* and *T,* should be carefully laid out. Cut to the curved lines with a coping, turning, or band saw, and finish with a spokeshave, plane, and sandpaper. Curves in bolsters *G, H,* and *I* can be treated in a like manner. With a gouge, the width of the axles, cut out grooves at the lower edges of bolsters *G* and *I* to receive the axles.

Bore all necessary holes in the wooden parts and iron braces *J', K',* and axles.

Steering Device. Use a broom handle or a mopstick for the steering shaft *O*. The cylinder *P* may be turned on a lathe or one can be easily shaped on the bench by hand.

An automobile steering wheel or a wooden wheel turned on a lathe can be used for the steering wheel.

A piece of sash cord or aerial wire of several strands makes excellent steering cables. Small pulleys or sash window pulleys work nicely for cable guides.

Wheels. Coaster-wagon wheels of the double-disk ball-bearing type are suggested for this car. Use steel-rod axles to fit the wheels

Patterns. Patterns of the hood and the back part of the "Blue Streak" are shown in Figure 3. Lay out the patterns on heavy paper first. Lay out on 1-in. squared paper as shown. This can best be drawn with a T square and triangle. Notice where the outlines of the patterns cross each square in the drawing. Transfer these patterns to your charts of squares (full size) by locating the same points as shown in Figure 3. Connect all points with lines freehand. The paper patterns are then traced on the metal.

Bill of Material

Part No.	*No. Required*	*Name*	*Size*
A	1	Baseboard	¾ x 11 x 73
B	1	Radiator board	¾ x 7 x 14½
C	1	Cowl	¾ x 10 x 16½
D	1	Seat back	¾ x 11 x 14
E	1	Back	¾ x 6½ x 9
F	1	Steering-shaft support	¾ x 6½ x 11
G	1	Lower front bolster	1½ x 3 x 11
H	1	Top front bolster	1½ x 3 x 8
I	1	Back bolster	1½ x 6 x 11
J	1	Steering-shaft guide	¾ x 8 x 10
K	2	Running-board supports	¾ x 3½ x 48
L	2	Running boards	¾ x 6 x 44
M	1	Seat	¾ x 11 x 11
N	1	Seat support	¾ x 1 x 11
O	1	Steering shaft	1" diam. x 35"
P	1	Cylinder	2½" diam. x 5"
Q	1	Ford or wooden steering wheel	
R	1	Front guide piece	¾ x 6 x 7
S	2	Front fender braces	¾ x 5 x 13½
T	2	Back fender braces	¾ x 5 x 13
U	2	Black iron No. 24 gauge	3½ x 21½
V	2	Black iron No. 24 gauge	5 x 19
W	1	Black iron No. 28 gauge or canvas	23 x 35
X	1	Black iron No. 28 gauge or canvas	26 x 36
Y	1	Trunk (see drawing)	
Z	2	Bumpers	¾ x 2 x 16
J'	1	Back bolster brace (band iron)	⅛ x ¾ x 9½
K'	1	Front bolster brace (band iron)	⅛ x ¾ x 8½

Assembling. Fasten *B, C, D,* and *E* to the baseboard *A* with No. 9 by 1¾-in. f.h. screws. Seat *M* is nailed to piece *N* and board *A*. Nail guide *J* to *C* and the front guide *R* to *B*.

The running-board supports *K* are attached to *A* with No. 9 by 1¾-in. f.h. screws. The running boards *L* are then fastened to the lower edges of *K* with No. 9 by 1¾-in. f.h. screws.

Fasten the back bolster *I* to the back end of *A* with No. 9 by 1¾-in. f.h. screws. In a like manner fasten the front top bolster *H* to the front of the baseboard *A*.

The rear iron brace *J'* is fastened to board *A* with a 3/16 by 1-in. stove bolt and to the rear bolster *I* with a 3/16 by 1½-in. stove bolt.

The front end of the iron brace *K'* is held in place by the kingbolt and the other end is attached to board *A* with a 3/16 by 1-in. stove bolt.

Attach the lower front bolster *G* to bolster *H* and to the front part of the car with a ½ by 7-in. carriage bolt (kingbolt). Use two large washers between *G* and *H*.

The axles are fastened to the back bolster *I* and the lower bolster G with 3/16 by 2-in. stove bolts. The wheels are held in place with cotter pins and caps.

Bore 1-in. holes through *C, J,* and *R* to receive the steering shaft.

Attach the steering shaft *O* next. Nail cylinder *P* to shaft *O* at point shown in Figure 2. One end of the shaft *O* fits and turns in guide *R*.

The steering shaft is held in place by a metal washer placed against guide *J* and a cotter pin or nail.

Wind the steering cable around cylinder *P;* carry it through the pulleys which are attached to base *A* and fasten the ends to the screw eyes to each side of the lower bolster *I*.

The steering wheel may be fastened to the shaft by means of a pin or r.h. screw through the hub of the wheel and shaft.

The metal hood *W* and back *X* are attached to the frame of the car with shingle nails or box nails. Use No. 7 by 1-in. r.h. screws or shingle nails to fasten the fender *U* and *V* to the top edges of the fender braces *S* and *T*.

Finishing. A very desirable finish which is most popular at present is the quick-drying enamel which may be obtained in a great variety of colors and shades. Make sure that the metal surface to be finished is perfectly smooth. This can be done by sanding the metal with No. 2/0 sandpaper. Wash the surface and every metal part with benzine or gasoline.

Apply one or two coats of enamel of the desired color. Follow the directions given on the container.

An automobile enamel is also suggested to color and finish the "Blue Streak." There are many nice auto-enamel colors on the market from which a boy may choose.

A simple gloss outside paint may also be used with good results, to finish this pushmobile.

Vocational Students Make Contribution to Highway Safety

K. H. Clark

Senior High School,
Fort Smith, Arkansas

Practical jobs are the proving grounds for the student of vocational subjects.

The chapter of the National Safety Council of Fort Smith, Arkansas, provided a week of free auto-safety inspection through the co-operation of a Safety Equipment Company, The Automobile Service Companies, and the students of the Fort Smith High School auto-mechanics trade class, the Safety Council furnishing the promotional inspectors, the Safety Equipment Company providing the equipment, the Automobile Service men the finances, and the vocational students the operative force.

The safety lane was located on one of the city's busy streets, in order to be as handy as possible to the motoring public, for both commercial and passenger-car traffic.

The lane was opened at eight o'clock a.m. and closed at five o'clock p.m. for a period of six days. Approximately 1,700 cars were inspected for proper condition of driving equipment, such as the horn, stop-lights, tail-lights, headlamps (lenses and reflectors, and low and high beams for proper focus and light-beam position on road), dimmers, rear-view mirror, windshield wipers, license-plate positions, insurance, tire condition, wheel alignment, and brake adjustment. If the car was passed O.K. in all these inspections, a label was pasted on the windshield which stated that the car had been inspected and was entitled to bear an O.K. inspector's mark. The label also acted as a membership card for the owner to the Fort Smith chapter of the National Safety Council. Of the total number of cars inspected, 55 per cent were found defective. A large number of the cars which received the O.K. label were found to have some defect at the time of the first test. They were advised as to what services were needed in order to pass inspection. Many owners took their cars to the local garages, received the proper services and came back for a new test and their O.K. labels. A large number of car owners took advantage of the free inspection. Even many old-model cars used the lane and some of these also received an O.K.

The lane was operated by twelve advanced students of the Smith-Hughes auto-mechanics trade class. The group was equally divided, and one group served for the first three days and the others the last three days. The boys were given credit in the trade-school subject, and were given leave of absence in their high-school subjects. To prepare the boys for their inspection duties, several days were spent studying the special equipments used in the safety lane, and of the causes and effects of improper conditions found in making the inspection. This served to give them a good background for their job. The lane also was visited the day before the tests began in order to arrange for last-minute plans, and to give the boys some preliminary practice.

The following day the lane was officially opened by the city commission, representatives of the safety council, and motor-car agencies. The latter provided a group of new cars for the first tests. Following this ceremonial opening, the general public followed.

The preliminary study of the safety lane which the boys had made, seemed to be very effective, as the students were able to execute their respective duties in an excellent manner. The manager of the safety-equipment firm gave them the very highest approval.

The real service to the school came from the fact that the students talked safety, studied safety, and operated an efficient safety lane. Parents and public were impressed. They realized what the school was doing for their children. They felt also that safety was brought to the community without being under the influence of some high-powered advertising scheme which sometimes destroys the desire to take advantage of free safety lanes.

The boys also received some real good from the opportunity of using new and modern equipment which otherwise they would not have had an opportunity to use. They realized, too, that they had had a chance to meet the public and to take part in a project that held real life interest.

Lectern constructed and carved by students in the Pitmaston Road School, Birmingham, England. H. Norwell, Headmaster. Submitted by J. I. Sowers, Miami, Florida

Simple, Inexpensive Weaving Looms—I

R. H. Jenkins

Director Department Industrial Arts, Humboldt State Teachers College, Arcata, California

The first of a series of articles on looms describes cardboard looms.

Although weaving has advanced to a stage where it is a very technical, fine art, there are yet possibilities for the beginner to gain pleasure and profit out of it in a simple way. With the increase of leisure, he may spend many hours profitably in creative work on a good loom which can be built by anyone who possesses some skill in the use of tools. Grain sacks, for instance, furnish good material for a very attractive, serviceable, tufted rug which would do credit to any weaver. Worn-out clothing, also, is a good source for the weft for making rag carpet. Old woolen sweaters can be raveled and combined with mercerized cotton warp to make useful scarfs, and new yarn can be utilized in making all-wool scarfs and handbags of a very fine quality. See Figure 1.

The edgings from curtain factories, if available, are fine for weaving rugs, and regular rug filler may be purchased cheaply enough to make attractive rugs possible even for those with limited means. Soft linen thread offers possibilities for napkins, handkerchiefs, and luncheon squares. The plain or tabby weaving, too, is such a simple process that no one need hesitate to try it. Of course, if one wants to go deeply into the subject, weaving will be found to be a complicated, difficult art that will be a challenge to one's ingenuity in every way. However, we are dealing here with simple processes that anyone can follow. Let us work with these processes and get a joy out of creating things that are much worth while.

The Loom

In studying the subject of looms, the writer was impressed with one marked feature of the older designs. They were workable, they were efficient, but they took up so much space that they were not practical in the modern small residence or apartment. There was a time when the loom was a necessary part of everyday life, but now it is only incidental. The loom, if it is to be used only periodically, must be compact enough to be stored away easily until the occasion for its use once more arises. To fill this demand, a series of experiments were carried on through a period of years until the present design was evolved, which seemed quite satisfactory. During this same development, two other features were kept in mind, namely, cost and ease of construction. It was found that only one main piece, the reed, had to be purchased, and even that could be built, though it was not entirely satisfactory to do so. A homemade reed or beater will work when made of wood, but it is coarse and wears out the warp much faster than the commercial product. The heddles, too, are so inexpensive that it hardly seemed worth while to spend the time tying them with string. Beyond these two items and a few five-cent pulleys, nails, and screws, the cost and construction is all within the range of any individual. The lumber can be old packing crates from a furniture store, and for fastenings, nails and a few screws are all that are necessary.

The Cardboard Loom

The cardboard loom, shown in Figure 2, is the simplest type of loom to be discussed. It is a practical loom for making handbags and purses, and is especially useful since the development of the zipper, which offers a convenient method for opening and closing the woven products. On the cardboard loom, one may weave a seamless bag of a very practical type. The weaving is of the very simplest form, being the plain under-and-over pattern worked out with a large needle. Designs show best in stripes, as the weft thread is much thicker than the warp.

To make the loom, cut a rectangular piece of cardboard, to dimensions which will suit the bag to be made. This may be a 5 by 8-in. purse, or a 10 by 16-in. bag. In any case, it is well to buy the zipper first, as the bag should be slightly wider than the zipper. It is very difficult to cut a zipper down to fit a bag, but not hard to sew up a bag to fit the zipper.

As soon as the cardboard is cut, punch along the side or end that is to be opened, a row of holes, ¼ in. apart. On the opposite side, or end, punch another row of

A. Rug woven from scrim-curtain edgings. B, C, and D. Scarfs, zipper handbags, and caps

holes in direct line with those on the beginning edge. Make the holes as near the edge of the cardboard as is practical and as close together as possible. Usually a quarter of an inch is as near as can be successfully done.

Use a large darning needle in threading this loom and as much yarn as can be successfully handled at one time. Tie the end of the yarn to the upper right hand corner hole in the loom. Pass the needle down through the lower corner hole and back up to the top. Run the thread through this first top hole, and back through the second. Pass down through the second hole at the bottom and back up and through the second hole at the top. Cross over and through the third hole at the top and down through a corresponding one at the bottom, and back up with a reverse through the fourth. Continue this process until the loom is completely strung with warp threads. Whenever new lengths of yarn are put in the needle, care should be taken to see that the pieces are so tied that the knots come at the end of the loom rather than in the middle where they would show in the finished product. By studying the threading, it will be found that when the loom is torn away, the warp will open easily at the one side.

Commence weaving at the lower right hand corner, and go under and over around the cardboard. When the beginning end has been reached a difficulty will be encountered. It will be found that the weaving will start back in exactly the same way it commenced. To overcome this, a thread must be skipped as an uneven number of warp threads is needed to make weaving of this kind correct. Of course, one thread can be left off, but usually it is just as well to drop a thread each time around. An easy way to make a design is to use varigated colored yarn, which will work out an interesting pattern. Avoid knots as much as possible, as the ordinary knot will show in the work. With the weft threads, the ends may be slightly lapped instead of knotting to hold them in place. A comb may be used to advantage for a beater. Weave as near the top of the loom as possible, and then break out the cardboard to get the finished product. When lined with a nice piece of silk, and closed with a good zipper, the results are very pleasing in every respect.

The Tam-O-Shanter Cap

The tam-o-shanter cap is another suitable problem for beginning students in weaving. Although it is often woven in the doll size, it is not at all impossible to weave a very satisfactory, full-size cap for everyday wear, and it is this practical feature that adds zest to the work.

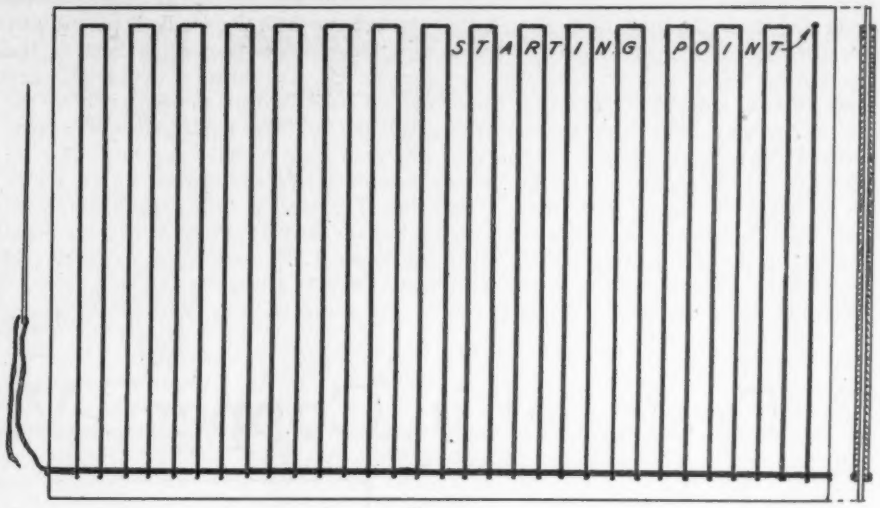


Figure 2

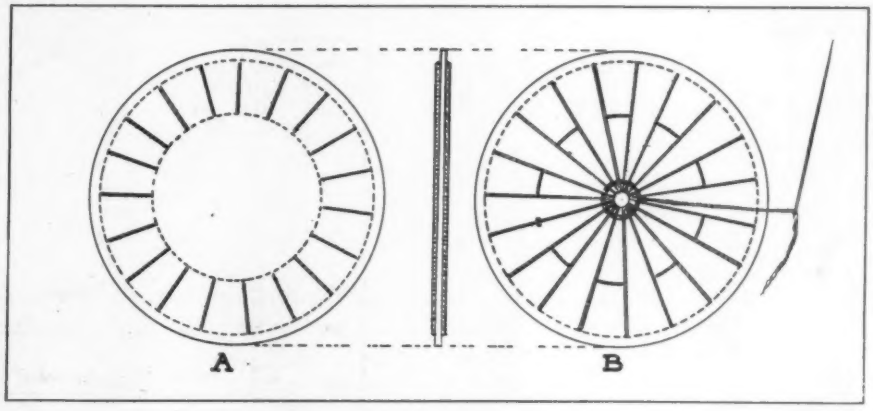


Figure 3

Cut a piece of cardboard of the solid, not corrugated, variety, and on its surface lay out a circle with a diameter equal to the size of the head for which the tam-o-shanter is to be woven. For example, a child's head will measure from 5 to 7 in., and a mature individual's from 7 to 7½ in. in diameter.

Around the first circle draw a second, using the same point as center and a diameter more than half again as large as the first. To illustrate, if in the first case, the circle had a diameter of 7 in., the new one should be enlarged to 12 in. This is necessary in order that the cap may have its proper fullness due to the lack of thickness in the loom. With the diameter enlarged still another ¼ in., draw one more circle from the same common center, and with a pair of tin snips or heavy shears cut out the loom, using this last circle as a guide. See Figure 3, *A* and *B*.

On the second circle mark off points approximately ¼ in. apart around the entire circumference. Change the measurements enough so that the total number of points will add up to an odd number. From these outside points draw lines to the center of the circle, and check the places where these lines cross the circumference of the inner circle. When all of the lines are drawn, and checks made on the intersections, the weaver should have a circular piece of cardboard upon which are inscribed two circles with a common center, and on these circles points marked off every ¼ in.

Holes must now be punched on all of the marked-off points, that is, on those set off on the outer circle and on the checked points on the inner circle. To do this, a leather punch and a hammer may be used, or in the absence of the leather punch, a nail, when sharply ground, will do nicely. Tie to the center of the loom a small wire ring similar to the ones to hang up hot-dish holders. This fastening can be done by piercing the loom in two places and tying the ring with a piece of string. The loom is then ready for the warp.

Use a good grade of four-ply yarn for the warp. Thread a large needle with as long a piece as can be conveniently handled, and tie the loose end of the yarn to the center ring. From the center

pass the needle through one of the outside holes and draw the yarn taut. Pass back toward the center to the inner circle and put the needle up through a hole in the inner circle in a direct line with the thread which has just been strung. Draw the thread tight, and, passing back to the edge, thrust the needle up through the first hole on the right of the one just strung. The next move is to the center, where a loop is made up through the ring and the warp drawn tight. The process is now repeated. From the center, the worker moves to the third hole on the outer edge. Down through this hole the needle is placed, and up through a corresponding hole in the inner circle. The thread is drawn tight and passed back through the next hole to the right on the inner circle. From this point the path leads back to the outer edge up through a hole and returns to the center ring. The work is thus a repetition, until all of the warp is strung. If possible, have all knots in the warp come at the ring in preference to a place in the main body.

To weave the cap, start at the center around the ring. The warp here will be so close that it will pay to go under and over two threads at a time until the weaving has reached a point where the warp is spaced far enough apart to make the passing under and over of each thread practical. Weave as tightly as possible to the outer edge and then turn over and weave the opposite side. When the weaving has been completed, the cardboard loom is torn out and the cap is finished, except for the tassel which is easily made and fastened to the center.

A Desk Set in Copper—V

Leon H. Baxter

Association for Crippled and Disabled, Cleveland, Ohio

The fifth of a series on an interesting art-metal project.

Rolling Blotter

The rolling blotter top is made of 18-gauge copper cut 2⅞ by 4⅝ in. Measure ⅜-in. squares at each corner as shown in Plate 6, slightly rounding the corners where indicated. Measure ¾ in. from opposite ends of the long sides and draw a line between these points 3/16 in. from the edge. Saw this section out, and round the inner corners slightly as shown in the front view. Saw this outline accurately and planish the entire surface as shown in Figure 10.[1] Bend the two long edges on the line at right angles and bend the ends a little more than 90 deg. as these will be bent still further later on to conform to the curve of the inserted spring brass. See Figure 11[1] for method of bending.

Copy the design on No. 20 brass, and finish carefully.

Cut a piece of spring brass wide enough to fit easily between the edges of the top piece, and about 5½ in. long. If this makes a curve of more than 2-in. radius shorten the length. If no spring brass is available, take ordinary brass and hammer with a mallet. This will harden the metal and enable it to retain its shape. Form the curve by hammering with a fiber mallet over a piece of pipe or anvil horn. This piece should be easily sprung in and out. Before inserting the brass, solder the design in place, as shown in Figures 4 and 5.[2] Clean all metal parts in pickle, and rinse and dry thoroughly.

[1]Page 285, September, 1937, issue of this magazine.
[2]Page 284, September, 1937, issue of this magazine.

(Continued on page 69)

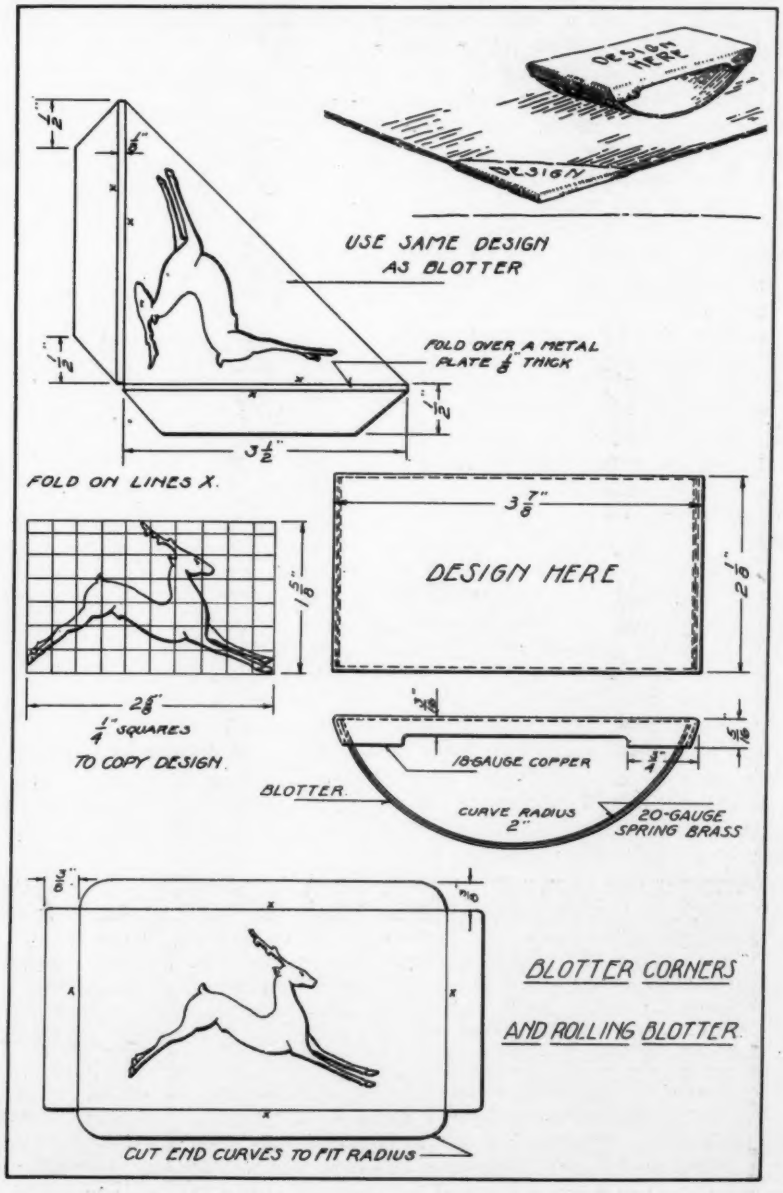
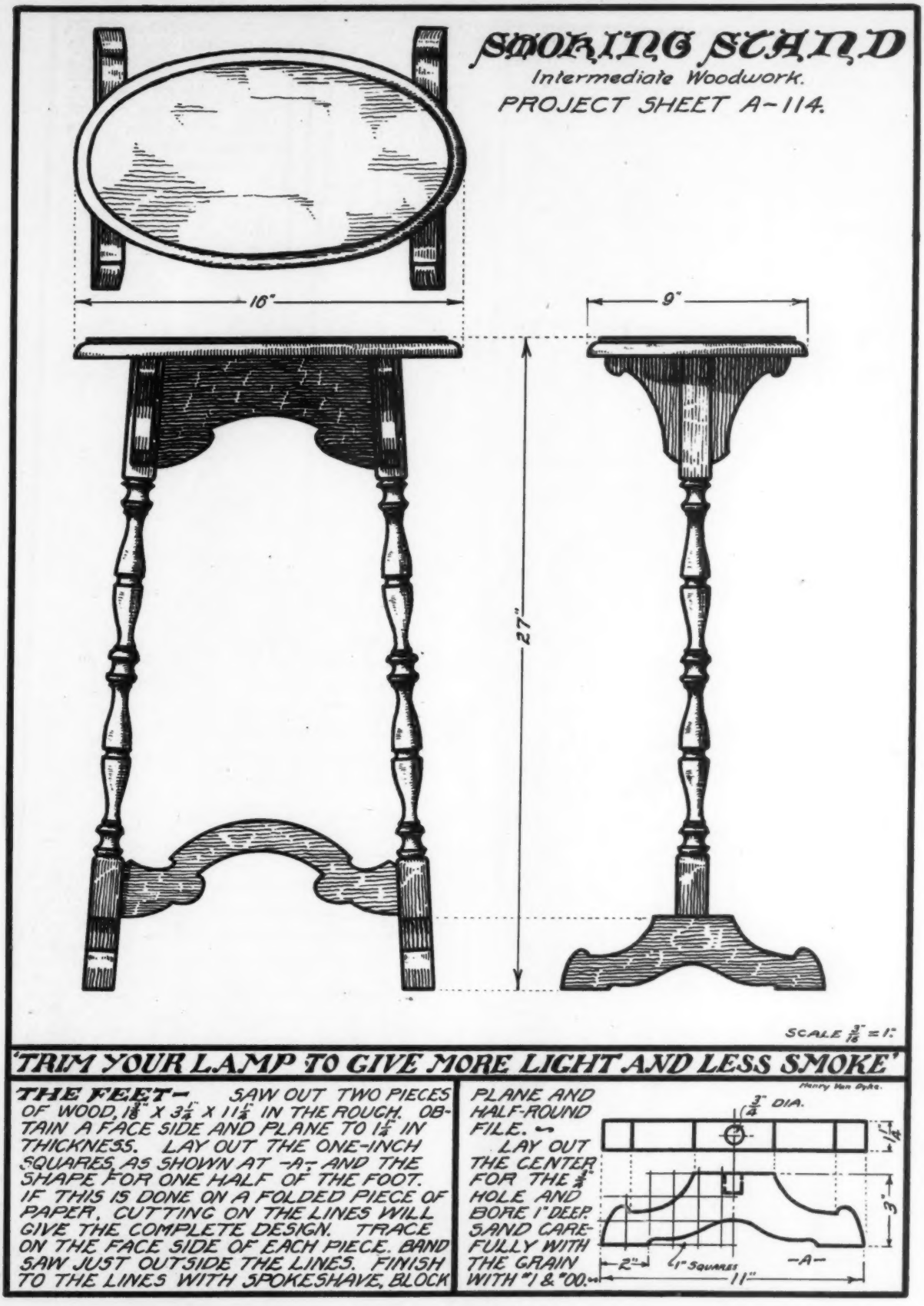


Plate 6


SMOKING STAND
Intermediate Woodwork.
PROJECT SHEET A-114.
10"
9"
27"
SCALE 3/16" = 1"
'TRIM YOUR LAMP TO GIVE MORE LIGHT AND LESS SMOKE'
THE FEET— SAW OUT TWO PIECES OF WOOD, 1 1/8" X 3 1/4" X 11 1/4" IN THE ROUGH. OBTAIN A FACE SIDE AND PLANE TO 1 1/8" IN THICKNESS. LAY OUT THE ONE-INCH SQUARES AS SHOWN AT -A- AND THE SHAPE FOR ONE HALF OF THE FOOT. IF THIS IS DONE ON A FOLDED PIECE OF PAPER, CUTTING ON THE LINES WILL GIVE THE COMPLETE DESIGN. TRACE ON THE FACE SIDE OF EACH PIECE. BAND SAW JUST OUTSIDE THE LINES. FINISH TO THE LINES WITH SPOKESHAVE, BLOCK PLANE AND HALF-ROUND FILE.
LAY OUT THE CENTER FOR THE 3/4" HOLE AND BORE 1" DEEP. SAND CAREFULLY WITH THE GRAIN WITH #1 & #00.
Henry Van Dyke.
3/4" DIA.
1 1/4"
3"
2"
1" SQUARES
-A-
11"

Submitted by Clifford B. Smith, Buffalo, New York

THE LEGS— CUT THE TWO LEGS FROM 1⅛" SQUARE STOCK AND TO A LENGTH OF 25". JOINT A FACE SIDE AND A FACE EDGE. THEN SAW TO 1⅛" SQUARE. YOU WILL HAVE TO SELECT VERY STRAIGHT PIECES TO ACCOMPLISH THIS. ↩

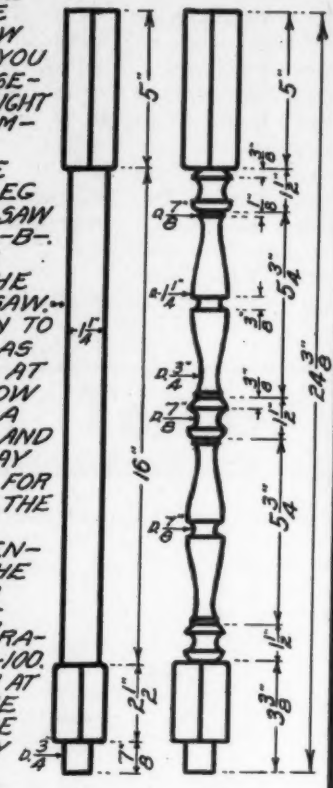
CENTER THE END OF EACH LEG BY TAKING THE SAW CUTS SHOWN AT -B-. YOU CAN DO THIS WITH EITHER THE BAND OR BACK SAW. ↩

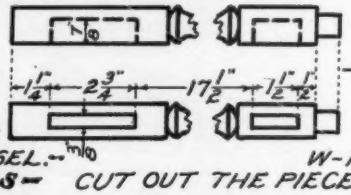
-B-

TURN TO 1¼" DIA. AS SHOWN AT -C-. NOW WITH A PENCIL AND RULE LAY OFF THE LINES FOR THE DETAILS AS THE LATHE RUNS. ↩

TURN THE CENTER PART OF THE LEG FIRST AND THE ENDS LAST, DUE TO THE VIBRATION. ↩ W-100.

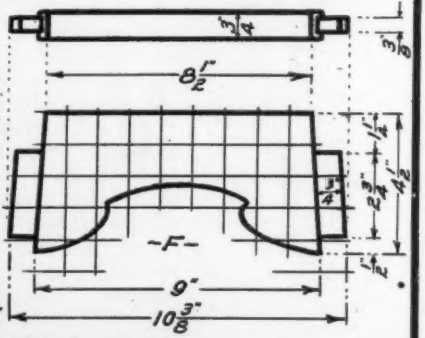
THE SKETCH AT -E- SHOWS THE LAYOUT FOR THE MORTISES. THEY ARE OBTAINED BY THE USE OF A SHARP PENCIL, TRY SQUARE AND MARKING GAUGE. BORE ON A MORTISING MACHINE OR MAKE AS MANY ⅜" HOLES AS POSSIBLE INSIDE THE SPACE AND THEN WORK TO THE LINES WITH A CHISEL. ↩





W-120.

THE RAILS— CUT OUT THE PIECES FOR THE RAILS A LITTLE OVER-SIZE. OBTAIN A FACE SIDE, THE THICKNESS AND LAY OUT THE SHAPE OF EACH. BANDSAW JUST OUTSIDE THE LINES. FINISH TO THE LINES WITH BLOCK PLANE AND CHISEL. ↩

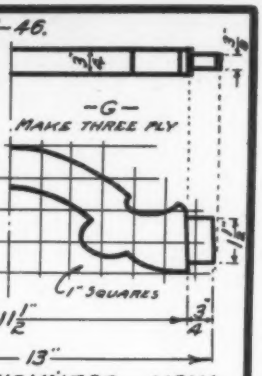


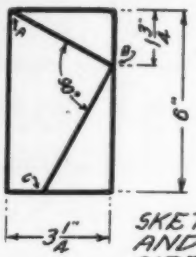
CUT THE TENONS ON THE CIRCULAR SAW TO FIT THE MORTISES. ↩ W-120.

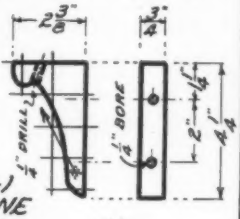
SAND ALL PIECES THOROUGHLY: SET BAR CLAMPS; HAVE SCRAP WOOD TO PROTECT FINISHED SURFACES; APPLY GLUE AND CLAMP UP. TEST FOR SQUARENESS AND WIND. WASH OFF SURPLUS GLUE. ↩ WT-46.

BRACES— TO BE OF MUCH VALUE, THE BRACES SHOULD BE MADE WITH GREAT CARE. EITHER MAKE OF THREE-PLY WOOD OR BE CAREFUL TO HAVE THE GRAIN RUN IN THE DIRECTION OF THE ARROW. ↩

MAKE BRACES IN THIS MANNER:- CUT THE FOUR PIECES ⅞" X 3½" X 6". OBTAIN A FACE SIDE AND THE THICKNESS. NOW MEASURE DOWN 1½" AS SHOWN, PLACE THE VERTEX OF A RIGHT ANGLE AT -B- (IN THE SKETCH AT -I-) AND WITH ONE SIDE PASSING THROUGH -A-, DRAW THE RIGHT ANGLE ABC. BAND SAW JUST OUTSIDE THE LINES AND PLANE TO LINES AND TEST FOR SQUARENESS. ↩







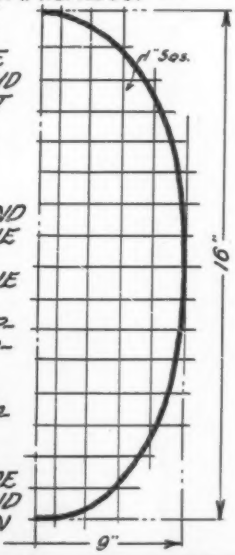
-H-

MAKE A PATTERN OF THE BRACE, APPLY TO WOOD, BAND SAW AND WORK TO LINES. ↩

LAY OUT THE HOLES FOR THE ¼" DOWELING WITH GREAT CARE. OBTAIN THE CENTER LINES ON THE EDGES OF THE BRACES AND ON THE PROPER FACES AT THE TOP OF EACH LEG. NOW MEASURE DOWN THE 1¼" AND 2" AND SQUARE SHARP PENCIL LINES ACROSS. CHECK CAREFULLY AND THEN STRIKE CENTER FOR EACH HOLE WITH SCRATCH AWL. BORE THE ¼" HOLES, TESTING CAREFULLY FOR SQUARENESS. CUT DOWELS ⅛" SHORTER THAN THE DEPTH OF THE HOLES. GLUE IN PLACE, WASHING OFF SURPLUS GLUE. TEST FOR SQUARENESS. ↩

THE TOP— GLUE UP STOCK FOR THE TOP, SELECTING THE GRAIN CAREFULLY AND ALTERNATING HEART AND SAPWOOD SIDES. IT IS BEST TO USE A DOWEL JOINT. ↩

FACE ONE SIDE, TESTING FOR WIND AND THEN GAUGE AND PLANE TO THICKNESS. LAY OUT ONE HALF OF THE DESIGN ON FOLDED PAPER, CUT AND APPLY TO TOP. BANDSAW OUTSIDE THE LINE AND IF TRUE, RUN THROUGH THE SHAPER. LACKING THIS MACHINE, THE SAME MOLDING CAN BE MADE WITH CIRCULAR SAW AND BLOCK PLANE. FASTEN WITH SCREWS. ↩



(Continued from page 64)

Cut a piece of blotting paper as wide as the brass and long enough to fold about ⅜ in. over the ends. Fume and finish the metal parts as described under finishing.[2] When finished, fold the blotter over the brass piece and insert in copper frame. Hammer the ends of the copper to fit lightly against the side edges and following the curve of the brass.

Use a ball-peen planishing hammer for this operation. The blotter is now complete.

Blotter Corners

Four of these corners are required and each is made from a piece of 18-gauge copper. To economize, two corners can be cut from a piece of copper about 4¼ in. square. Square up the pieces to 4 3/16 in. on a side, and cut on a diagonal. Measure in from the corners and ends ½ in. on the short legs and saw or cut off the corners with a pair of tinner's snips. Then saw out the ⅛-in square as shown on Plate 6. Planish the surface, except the flaps which turn under as shown in Figure 10.[1]

Anneal to soften before bending and then bend over a piece of ⅛-in. scrap metal (see Fig. 11[1]), being sure to make clean-cut square edges.

Cut the design, as was done in the other pieces of the desk set, from a piece of 20-gauge brass. File, emery, and finish with steel wool, removing all scratches. Prepare and solder in proper position, as shown in Figure 4.[2] Be sure that the deer face left and right on each set of pairs. Glue a piece of felt to the bottom of each corner. After fuming, finish and wax.

To assemble the four corners use a piece of fairly heavy cardboard as a base with the blotter on top. Enough cardboard or blotters should be used to cause the corners to fit snugly.

Testing and Tests

ACHIEVEMENT IN ELECTRICAL SCIENCE

Aaron Axelrod, Vocational School, Bayonne, New Jersey

Instructions

1. The time allotted for this test is 55 minutes at the maximum.

2. *Read* the heading at each part before starting to answer the questions of that part.

3. *Read* the examples very carefully so that you may note what is wanted.

4. Be sure to *circle* your answer in Part I; *number* your answer in Part II; *number* your answer in Part III; and *label* your answer in Part IV.

5. Part I consists of 55 true and false statements. *Do not guess* at the answers as you will lose double credit for each incorrect answer. The score for this part is the number correct less the number wrong. It is to your advantage not to answer a question rather than to guess at the answer.

6. Part II consists in matching the symbols and names. The scoring of this part is only the number correct.

7. Part III consists of 35 questions where you have to make *one* choice out of four for the correct answer. There is only one correct answer in each of these statements. The number correct is the score for this part.

8. Part IV consists of a series of drawings which have to be recognized and some of the parts labeled. The number correct is the score. Be sure that you carefully note the arrows with their numbers.

9. In Parts II and III, be sure that your numbers are very clearly written otherwise they will be marked wrong.

10. Use a soft pencil if possible. Ink may also be used.

PART I

True and False Statements

The statements listed below are either true or false. Place parentheses about the letter *T* if you think the statement is true or place parentheses about the letter *F* if you think the statement is false.

Example: (T) F Some airplanes are largely made of duralumin.

T (F) Glass is very soft.

T F 1. A magnet is a substance having the peculiar property of attracting iron and steel to it. T*

T F 2. Secondary cells are storage batteries. T

T F 3. The primary winding of a step-down transformer has more turns than the secondary winding. T

T F 4. The induction coil is a device that always steps up the voltage. T

T F 5. Tungsten wire is used in electric lamps. T

T F 6. There are zinc plates in storage batteries. F

T F 7. An ammeter should have a very low resistance. T

T F 8. The current in a series circuit is of the same strength throughout the entire circuit. T

T F 9. Conductance is just the opposite of resistance. T

T F 10. Flux is the name given to the magnetic lines of force of a magnet. T

T F 11. Iron wire is a good conductor of electricity. F

T F 12. The north pole of a magnet points to the north pole of the earth. F

T F 13. Dilute sulphuric acid is used in storage batteries. T

T F 14. Generators transform mechanical energy into electrical energy. T

T F 15. Wires are measured in mils. T

T F 16. A bell transformer is so called because Alexander Graham Bell made it. F

T F 17. A galvanometer is used to detect small currents. T

T F 18. A fuse is a good insulator of electricity. F

T F 19. An electromagnet is a device which depends upon electricity for its power. T

T F 20. The plug fuse is the type fuse used in most private houses. T

T F 21. Polarity is a property peculiar only to magnets. T

T F 22. A conductor of electricity is the medium by which electricity is transferred easily. T

T F 23. A compass is only a freely swinging magnet. T

T F 24. The magnetic field of alternating current changes as the current changes. T

T F 25. Silver has a higher conductance factor than copper. T

T F 26. Motors transform mechanical energy to electrical energy. F

T F 27. The resistance of metal conductors depends in part upon the material of which the conductor is made. T

T F 28. In any magnetic substance, each molecule is a magnet. T

T F 29. Sal-ammoniac is used in dry cells. T

T F 30. The unit of electrical power is the watt. T

T F 31. Ohm's law is applied to solving problems in electrical power. T

T F 32. The permeability of steel is much greater than that of air. T

T F 33. If the connections of a d.c. series motor are changed, the direction of rotation will also change. F

T F 34. An e.m.f. may be induced in a wire by moving the wire between the poles of a permanent magnet. T

T F 35. A Wheatstone bridge is used in measuring unknown resistance. T

T F 36. When electricity is flowing through iron wire, there is heat generated in the wire. T

T F 37. Electrons are negative charges of electricity. T

T F 38. The term *frequency* is applied only to alternating current. T

T F 39. A motor designed to operate on 25 cycles will successfully operate on 60 cycles. F

T F 40. The stator of an a.c. motor is the part that revolves. F

*The key letter appears at the right of each statement.

T F 41. A transformer can be used to change the frequency of a circuit. F

T F 42. A wire carrying a current of electricity has a magnetic field surrounding it. T

T F 43. The ratio of currents in the primary and secondary windings of a transformer is inversely proportional to the ratio of voltage. T

T F 44. The scale of an ammeter is frequently calibrated in volts. F

T F 45. An electromagnet has the same kind of iron as a permanent magnet. F

T F 46. The two plates of a dry cell are made of zinc. F

T F 47. A chemical change takes place when a storage battery discharges. T

T F 48. All magnets have two poles. T

T F 49. A rheostat is used to control the amperage of a circuit. T

T F 50. The retentivity of steel is greater than that of iron. T

T F 51. All known substances have resistance. T

T F 52. Nichrome wires have high resistances. T

T F 53. Commutators are used on a.c. generators. F

T F 54. Synchronous motors are made only in polyphase. T

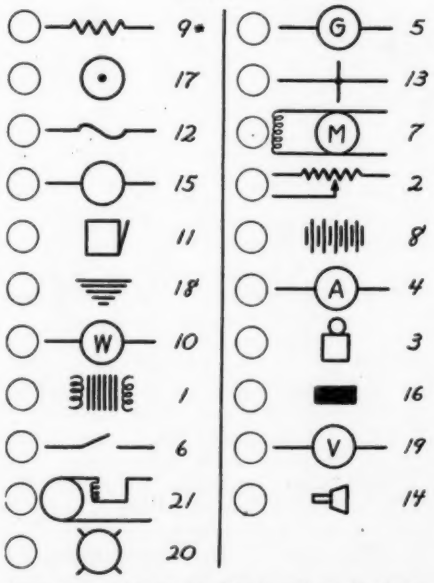
T F 55. Lamp cord is frequently called duplex wire. T

PART II

Recognition of Electrical Symbols

The following symbols as used in the electrical trade and on electrical drawings. These have been adopted by the American Institute of Architects and the National Electrical Association of America.

Group I



The symbols shown in Group I have their names listed in Group II. Find the name of each symbol and place the number of that name in the circle in front of each symbol.

Group II

1. Transformer. 2. Variable resistance. 3. Bell. 4. Ammeter. 5. Generator. 6. Single pole switch. 7. Shunt motor. 8. Battery. 9. Resistance. 10. Wattmeter. 11. Buzzer. 12. Fuse link. 13. Connection. 14. Telephone outlet. 15. Incandescent lamp. 16. Distributing panel. 17. Push button. 18. Ground. 19. Voltmeter. 20. Ceiling outlet. 21. Series motor.

PART III

Multiple Choice

Select the proper word or words to make the statement complete and true. *Place the number of the word or words selected in the parentheses at the beginning of each statement.*

Example: (3) All space is believed to be filled with (1) matter (2) metals (3) ether (4) oxygen

( ) 1. The metal having the highest conductivity is (1) copper (2) iron (3) lead (4) brass 1*

( ) 2. The number of cycles completed in one second is called (1) amperage (2) frequency (3) voltage (4) resistance 2

( ) 3. The best method to measure resistance is by the (1) ammeter-voltmeter method (2) Wheatstone bridge (3) Ohm's law (4) ohmmeter 4

( ) 4. The machine that transforms mechanical energy to electrical energy is (1) the motor (2) the generator (3) the transformer (4) the induction coil 2

( ) 5. The scientist who is generally credited with having discovered induced currents is (1) Edison (2) Helmholtz (3) Faraday (4) Volta 3

( ) 6. The metal having the highest retentivity is (1) copper (2) iron (3) steel (4) silver 3

( ) 7. To lower the voltage of alternating current, we use a (1) generator (2) alternator (3) transformer (4) motor 3

( ) 8. The device used to detect the presence of small amounts of electricity is the (1) ammeter (2) galvanometer (3) electroscope (4) voltmeter 2

( ) 9. If a 10-ohm lamp and a 15-ohm lamp are placed in series on a 50-volt circuit, the amperage will be (1) 2 amperes (2) 1 ampere (3) 5 amperes (4) 3½ amperes 1

( ) 10. If a copper wire and an iron wire were of the same length and cross section, the resistance of the copper wire as compared to the resistance wire would be (1) larger (2) smaller (3) the same (4) twice as large 2

( ) 11. The metal having the lowest reluctance is (1) iron (2) copper (3) silver (4) brass 1

( ) 12. If an electric iron uses 5 amperes on a 110-volt circuit, the watts used will be (1) 24 (2) 550 (3) 110 (4) 660 2

( ) 13. The volt is the measure of (1) air pressure (2) current (3) resistance (4) potential 4

( ) 14. A metal much used for electric-light filament is (1) copper (2) tungsten (3) nichrome (4) iron 2

( ) 15. An electromagnet must have a (1) core (2) relay (3) secondary winding (4) binding posts 1

( ) 16. A voltage is generally induced in a wire when it is placed (1) in a magnetic field (2) near a magnet (3) in a changing magnetic field (4) near a transformer 3

( ) 17. The unit of current is the (1) ampere (2) volt (3) watt (4) ohm 1

( ) 18. Transformers can be made to operate on (1) direct current (2) alternating current (3) current from a storage battery (4) current from dry cells 2

( ) 19. A Wheatstone bridge measures (1) amperage (2) voltage (3) power (4) resistance 4

( ) 20. In a simple electric cell, the plates must be (1) zinc and copper (2) copper and carbon (3) made of different material (4) made of the same material 3

( ) 21. The usual lamp voltage in our homes is (1) 220 volts (2) 110 volts (3) 55 volts (4) 330 volts 2

( ) 22. Nichrome wire is used in (1) house wiring (2) lamps (3) electric toasters (4) transformers 3

( ) 23. Carbon brushes are usually used in (1) generators (2) relays (3) transformers (4) induction coils 1

( ) 24. A permanent magnet is made of (1) steel (2) iron (3) copper (4) cobalt 1

( ) 25. Of the four conductors, the best is (1) copper (2) iron (3) lead (4) nichrome 1

( ) 26. A telephone receiver contains a (1) relay (2) fuse (3) circuit breaker (4) permanent magnet 4

( ) 27. Steel is used as (1) transformer cores (2) laminations in motors (3) electromagnets (4) permanent magnets 4

( ) 28. The best protection for an overloaded circuit is (1) a switch in the circuit (2) a fuse in the circuit (3) a cutout (4) heavy insulation on the wires 2

( ) 29. A commutator is always present on (1) an a.c. motor (2) a d.c. generator (3) an a.c. generator (4) a relay 2

( ) 30. In a transformer the ratio of voltages is 5:1; the current ratio will then be (1) 5:1 (2) 1:5 (3) 5:5 (4) 1:1 2

( ) 31. The frequency of alternating current is (1) the r.p.m. of the rotor (2) the number of cycles per second (3) the voltage of the circuit (4) the current of the circuit 2

*The key number appears at the right of each statement.

( ) 32. The source of electricity in the 3 bell circuit is (1) the bell (2) the push button (3) the dry cells (4) the conductors

( ) 33. A mil is equal to (1) .0001 inch 2 (2) .001 inch (3) .00001 inch (4) .1 inch

( ) 34. If there are 40 watts being used 4 on a 100-volt line, the amperage is (1) 4400 (2) 440 (3) 4.4 (4) .4

( ) 35. If you reverse the connection of 2 the field of a small d.c. motor, the direction of rotation is (1) the same (2) changed (3) slower (4) faster

Score.....

PART IV

1. Figure 1 represents a .....
2. It is used for circuit .....
3. Part 1 is called .....
4. Part 2 is called .....
12. Part 2 is called .....
13. Part 3 is called .....
14. Part 4 is called .....
15. Part 5 is called .....
16. Part 6 is called .....
17. Figure 3 illustrates the .....
18. The polarity of Part 1 is .....
19. The polarity of Part 2 is .....
20. The arrows show the direction of the flow of the .....
21. Figure 4 represents a .....
22. Part 1 is a .....
23. Figure 5 represents 3 dry cells connected in .....
24. If the voltage of each cell is 1½ volts, the voltage at A is ..... volts.
25. Figure 6 shows the dials of a .....
26. The reading at A is .....
27. The reading at B is .....
28. The reading at C is .....
29. Figure 7 represents a cross section of a .....

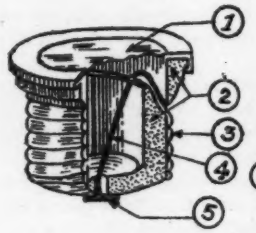


Figure 1

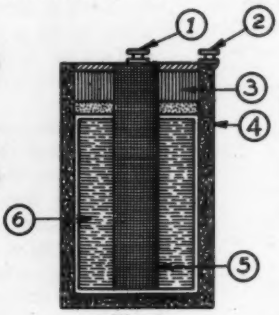


Fig. 2

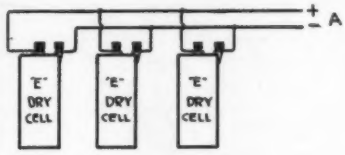


Fig. 5

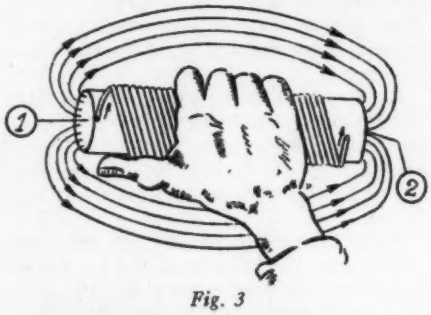


Fig. 3

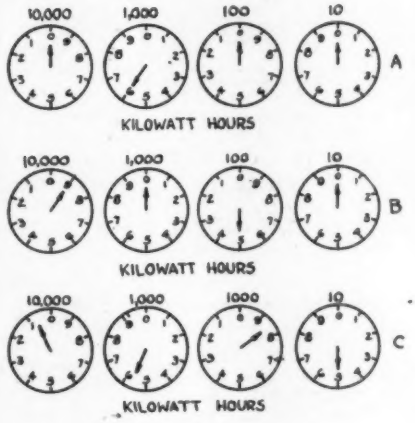


Fig. 6

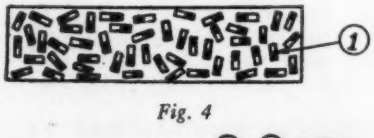


Fig. 4

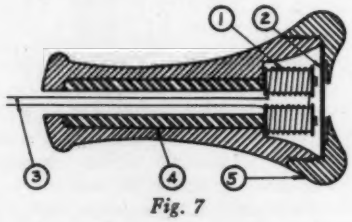


Fig. 7

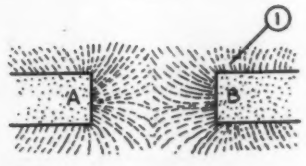


Fig. 8

5. Part 3 is called .....
6. Part 4 is called .....
7. Part 5 is called .....
8. It is used on voltages up to ..... volts.
9. Figure 2 represents a .....
10. For its electrical energy, it depends upon .....
11. Part 1 is called .....
30. Part 1 is called .....
31. Part 2 is called .....
32. Part 3 is called .....
33. Part 4 is called .....
34. Part 5 is called .....
35. According to the law of magnetism, Figure 8 represents .....
36. Part 1 represents .....
37. The polarity of A and B must be .....

WOODWORKING TEST

G. T. Malbone, Piedmont Junior High School, Charlotte, North Carolina

Directions:

Place your name and homeroom number at the top of a separate sheet of paper. Number down your sheet for 25 spaces, answering each of the following with but one word.

1. What do we call a rectangular channel cut with the grain?
2. What would be the diameter of a hole made by a No. 5 gimlet bit?
3. What type of screw is used where the head is sunk under the surface of the wood?
4. Name the type of saw arrangement or box that will cut a 45-deg. angle.
5. What type of head does a finishing nail have?
6. With what does one drive the head of a brad under the surface of the wood?
7. With what tool is a rough or square block cut down to a cylinder on the lathe?
8. With what do we test diameters on the lathe?
9. Are needle-leaf trees considered hard or soft woods?
10. Name a saw that is used when handsawing curved work.
11. With what is oil stain thinned?
12. Give the one name that could be applied to all types of tailstock centers.
13. What would be the diameter of a hole made by a No. 6 auger bit?
14. Name the instrument that holds and turns an auger or gimlet bit.
15. What do we call a rectangular channel cut across the grain?
16. With what is shellac thinned?
17. What type of center is used in the headstock of the lathe?
18. Should the grinding wheel travel away from you or toward you?
19. Which is the harder wood, birch or poplar?
20. Name the layer found directly under the bark of a tree.
21. What type of stain is thinned with alcohol?
22. Is the cutting end of the plane iron an example of a bevel or a chamfer?
23. Which one of the three common types of stain will penetrate nonfilled wood the deepest?
24. What type of cut is always made on faceplate and screw chuck work?
25. What has been done to orange shellac to produce white shellac?

Spelling Test

The teacher is to dictate the following list of words:

1. Lathe	9. Cedar	18. Chamfer
2. Calipers	10. Poplar	19. Gouge
3. Dividers	11. Alcohol	20. Countersink
4. Gauge	12. Paraffin	21. Expansive
5. Skew	13. Auger	22. Corrugated
6. Shellac	14. Tenon	23. Chisel
7. Vise	15. Mortise	24. Whet
8. Turpentine	16. Gimlet	25. Ferrule
	17. Mahogany	

Problems and Projects

A SUGAR SCOOP

Gerald A. Boate, Seattle, Washington

The project illustrated and described herewith furnishes a means for maximum instruction at minimum cost. It captivates both the beginning seventh-grade boys and their mothers. The boys bring the cans from home. This is insisted upon for two reasons: (1) It awakens a home interest in the shop and a curiosity to know what can be made from a small can which is usually thrown away. (2) It teaches a boy to find some material himself and thus firmly plants an idea that things thrown away may often, with a little thoughtful work, be turned into something quite useful.

This sugar scoop is different from the ordinary type usually seen. Notice where the handle is placed. This is done so the scoop, if its contents are not immediately wanted, may be stood on end.

Method of Procedure

1. Figure 1 shows the can as it comes from home. The top is removed and thrown away.

2. Every bit of the original paint on the can must be scraped off, using a knife blade as shown in Figure 2. If the knife blade is held vertically between the thumb and first and second fingers, the paint may be removed in a jiffy. Then the surface must be polished with emery cloth.

3. The next step is to make a paper template of the side of the scoop, as shown in Figure 3. After the curve is scribed on the two sides of the can by means of this template, the cutting out is done by starting work from the open end of the can with the curved snips. The left-hand side should be cut first. By sighting through this cut, the opposite curve may be made to coincide with the first. The waste metal is then forced upward, like a hinge and the end is cut square across.

4. Next, lay out the handle. See Figure 4. For this use a piece of bright tin scrap. Use a marking gauge to scratch the folding line down both edges lengthwise. Make the folds over the edge of the bench with a mallet, or use the bar folder. In either method, the edges must be folded down flat. The folded-over edges are always on the outside of the handles in all tinware.

5. Form the handle, as shown in Figure 5 and 6, over a short piece or iron pipe, which is about ¾ in. in outside diameter.

6. Turn the handle upside down and spread soldering paste lightly over the surface which is flat.

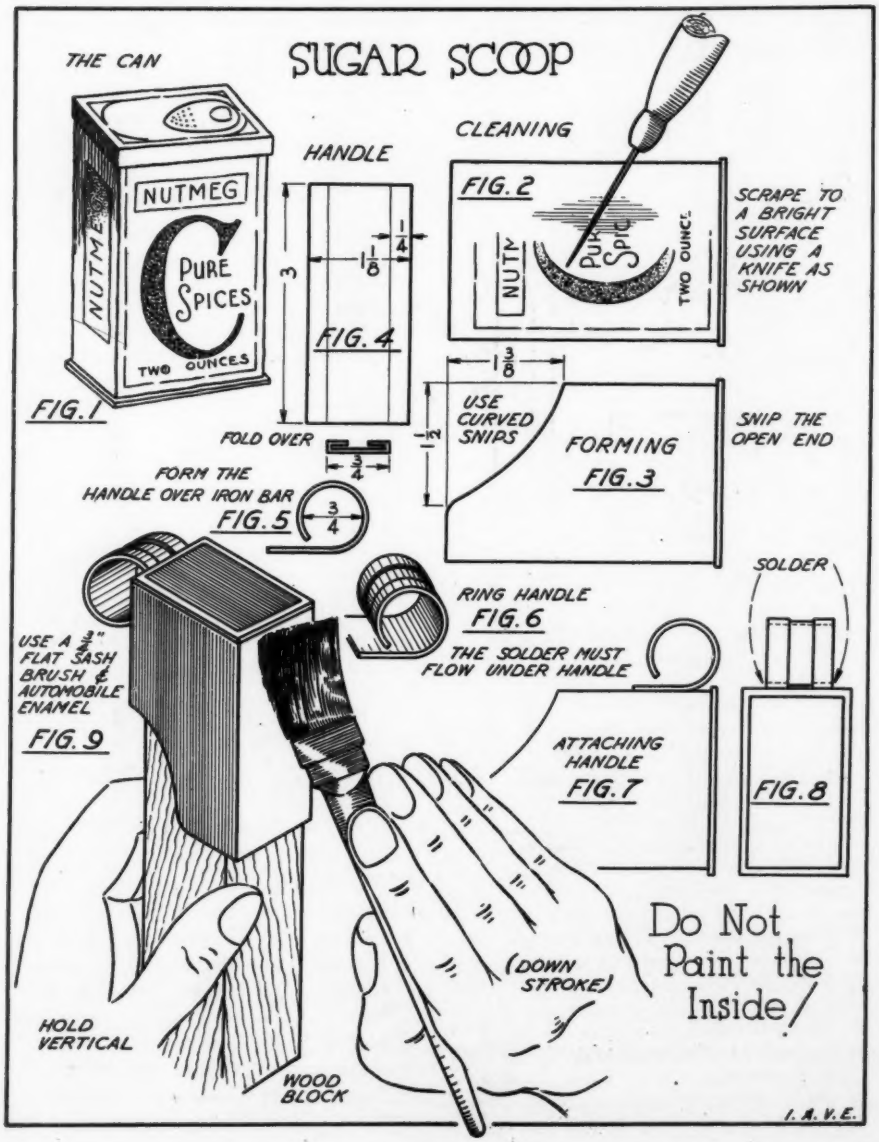
7. Place the handle centrally on the scoop in the position shown in Figures 7 and 8. Heat and wipe clean a well-tinned soldering iron. Using a finger of wire solder, hold the handle from the front in position with a pair of gas pliers being sure that the back of the handle is in line with the back of the scoop. Run the solder smoothly under both edges of the handle.

8. Wipe the outside of the scoop carefully, using a clean piece of rag. Then place the scoop over the end of a wood block as shown in Figure 9.

9. The outside of the scoop may be painted, using either quick drying automobile enamel or brushing lacquer. The paint must be well stirred from the bottom before using, and the lid kept on the can when the paint is not in use.

A small flat painting brush, with rather long soft bristles should be used. Do not dip the brush into the paint more than halfway up the bristles. Apply the paint quickly and brush over the surface only once. If the brush is used again over a wet spot when using quick drying paint, the paint will pucker.

Do not paint the inside of the can.



HANGING BASKETS FOR FLOWERS OR PLANTS

Dean Kittle, South High School, Lima, Ohio

This little hanging basket has been very popular in my classes for several years. Some boys want to make two of them to use on each side of a window or doorway.

The basket part is made of 28 or 30 gauge galvanized iron, laid out as shown in Figure 1, and soldered water tight. It can be used for cut flowers, winter bouquets or small plants. (Boston ivy or asparagus fern is very nice.) 11½ in. of brass jack chain is required divided into three pieces and a brass ring ⅝ or ¼ in. in diameter.

The bracket shown in Figure 2 is made of

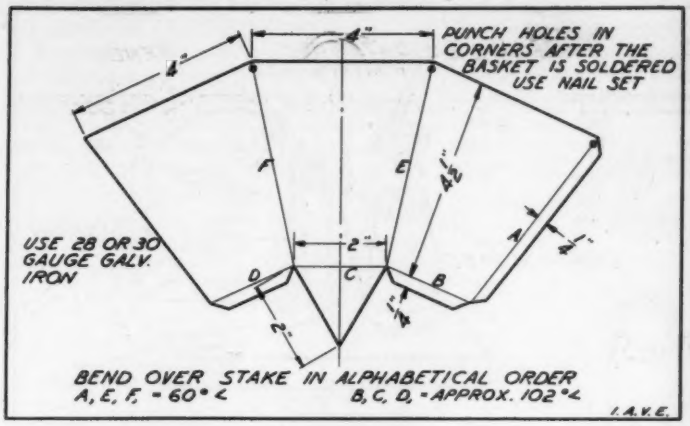
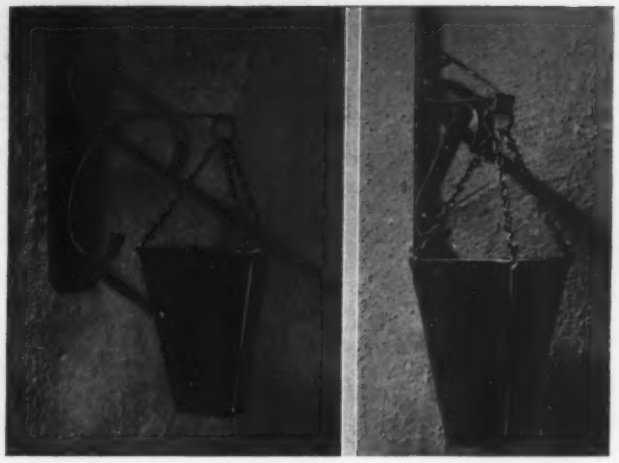


Fig. 1



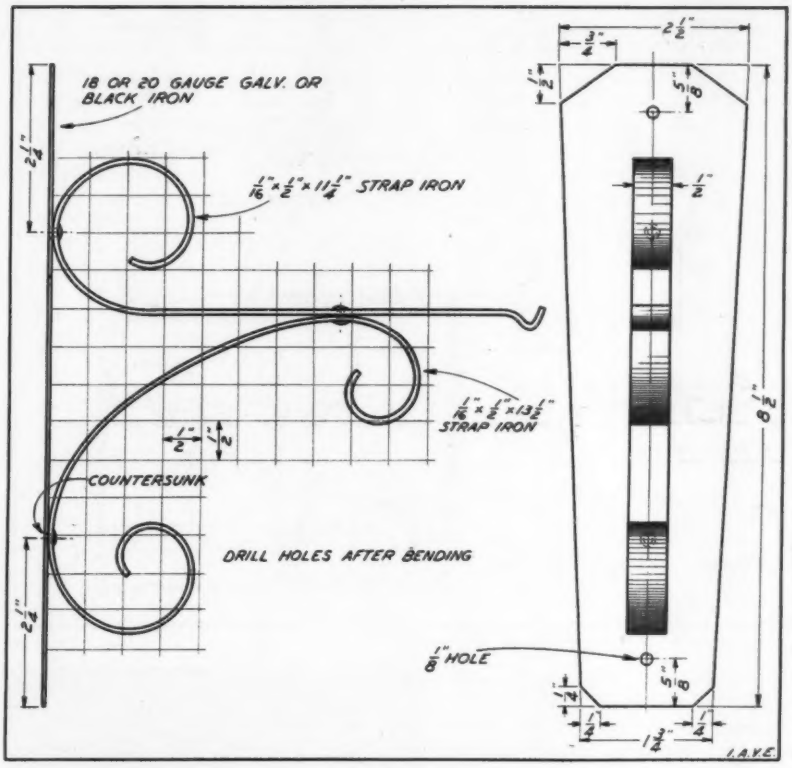


Fig. 2

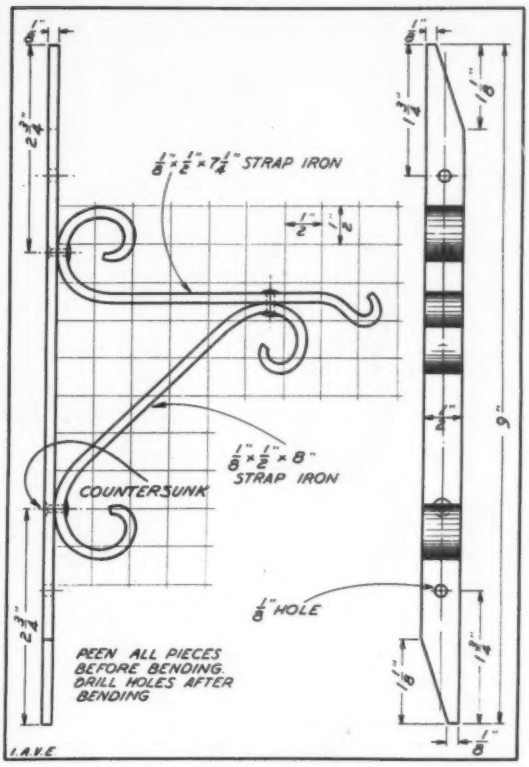

1/8" x 1/2" x 7 1/4" STRAP IRON
1/8" x 1/2" x 8" STRAP IRON
COUNTERSUNK
1/8" HOLE
PEEN ALL PIECES BEFORE BENDING. DRILL HOLES AFTER BENDING
9"
I.A.V.E.

Fig. 3

1/16 by ½ in. strap iron, with 18 or 20 gauge black or galvanized iron for the back. The bracket shown in Figure 3 is made of ⅛ by ½ in. strap iron. All pieces riveted with ⅛ in. iron rivets. The bracket shown in Figure 2 is the more popular.

They are finished with black or green quick-drying enamel with bronze powder dusted on before the paint is dry. The metal bellows for dusting Black Flag or other insect powder is convenient for applying the bronze powder.

TIME SWITCH

Byron M. Taylor, W. Wilson Junior High School, San Diego, California

The cost of a time switch which will actuate electrical devices in the household is not inconsiderable. Such switches turn on and cut off radios, lights, heaters, and the like at some preconceived period. The time switch with which this work sheet is concerned embodies an ordinary, comparatively cheap, alarm clock. Use is here made of the fact that the alarm-spring winding key revolves as the alarm goes off. By extending the key shaft outward, provision is made for pulling the switch. See Figure 1.

The switch proper is an ordinary light socket of the pull-chain variety. The chain is wound one and one half times around the extended shaft, and sufficient tension applied to the free end to pull the switch and yet (if the operator so desires) permit the alarm to persist.

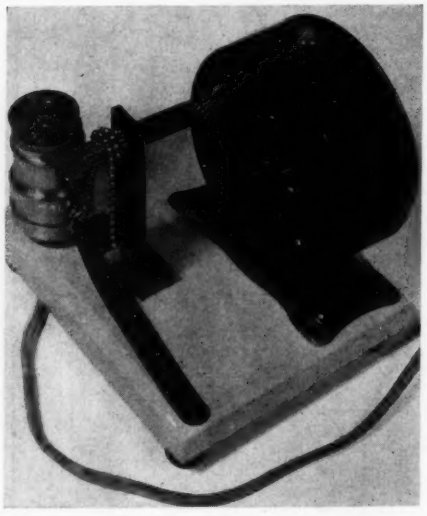
Construction details can be given only in general terms because alarm clocks vary quite widely in size and key arrangement. Therefore, the type of clock employed will determine the size of the baseboard, the height of the standard shown in Figure 4, the length of the shaft (Fig. 3), and the shape of the spring. All time switches after this pattern will require that the constructor use for the shaft extension a piece of ⅛-in. (iron-pipe size) brass pipe and that he form channels or drifts at one end about 1/16 in. deep, as shown in Figure 3. It is desirable, but not necessary, that the channels or drifts be spaced a distance apart which will match the distance apart of the sections of the pull chain. What is sought is sufficient friction between the shaft and the pull chain so that the switch will be actuated and yet the alarm continue to sound.

Figure 2 is a plan view of the working model constructed by the writer. It is seen

that the clock and the light socket occupy diagonally opposite corners of the base, thus leaving a clear space for the hand in winding and adjusting the clock. The construction shown in Figure 5 will give a firm mounting of the socket.

Measure the height of the alarm-spring winding key above the base and make a standard, or support, out of 18-gauge sheet metal, as shown in Figure 4. The height of the winding key above the base determines the height of the ½-in. hole in the standard above the base. The purpose of the standard is to prevent rocking the clock on its base when winding the alarm. Make a mark on the base exactly under the winding-key hole. At this point, erect a perpendicular to the back of the clock. On this line, fasten the standard with two screws. Position the standard so that about 1 in. of the shaft extension will be free for the winding of the pull chain.

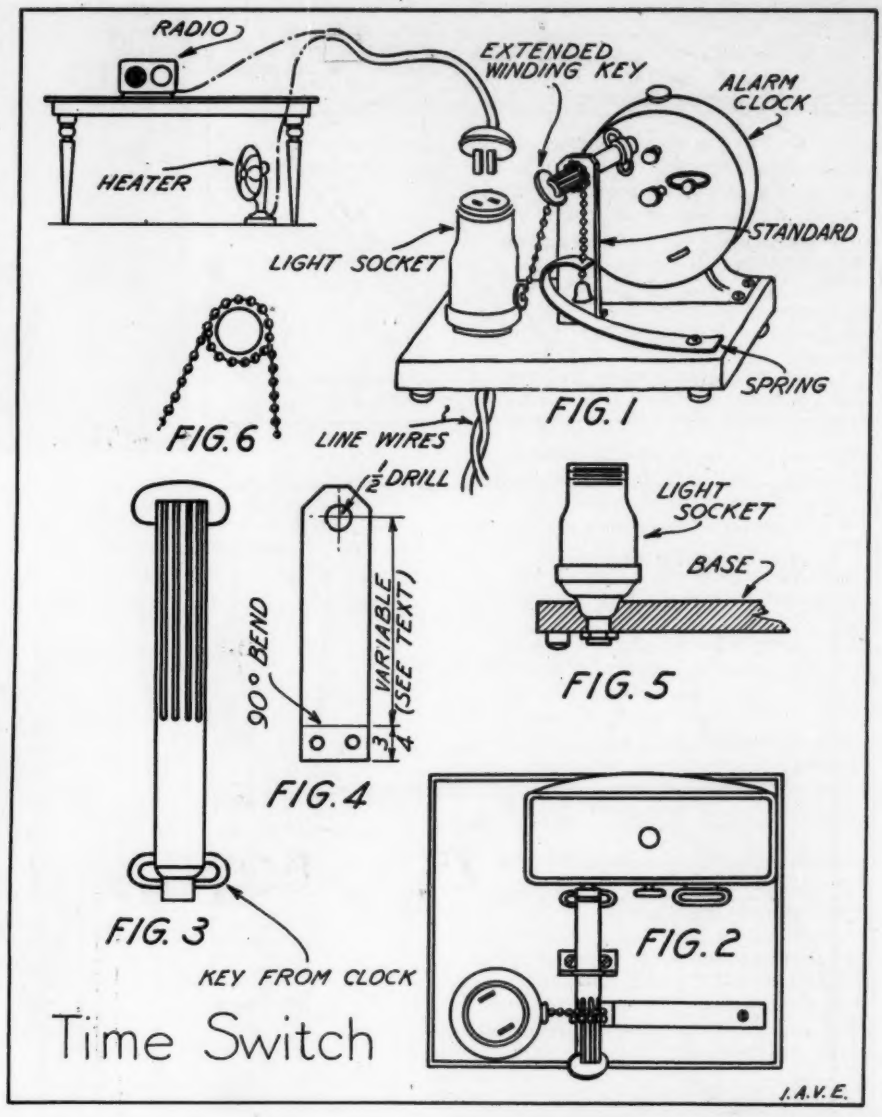
Construct the shaft extension by cutting



off a piece of pipe of the kind previously described. Notch both ends — one to receive the alarm-key head and the other to receive a flat piece of metal as a winding handle (Fig. 3). Before soldering these pieces in place, the channels or drifts should be cut. A hacksaw and file will be found sufficient for doing the work. Cut each drift about 1/16 in. deep. See Figure 6. Note that the standard must be placed on the shaft previous to doing the soldering.

The tension spring is cut and shaped so that it engages the chain and pulls on it about as shown in Figure 1. Use an old hacksaw blade, heating the end before bending it over. Notch the bent end so that it will engage the sections of the pull chain. A spring so shaped affords three ways of adjustment: Changing the shape of the bent part, changing the position of the holding-down screws, and changing the length of the chain engaged on the notch. Vary these various factors until the switch is pulled without arresting the alarm. For some uses, of course, the constructor will remove the alarm bell entirely.

To set the time switch, pull up on the free end of the spring so as to relieve the tension and thus return part of the chain into the light



socket until a slight click announces that the switch is set. Wind the alarm and set it for the time desired. (Of course, the clock must be running.) Whether the switch will be pulled on or off with the alarm depends upon the condition of *on* or *off* of the light socket at the time of setting.

VACUUM-CLEANER SOLDERING TORCH

E. L. Longley, Baltimore, Maryland

While teaching jewelry work in a summer school in a rural location, the author was faced with the difficulty of obtaining the heat required for hard soldering. Alcohol torches were tried but with only fair results, as the students found difficulty in blowing a steady stream of air while watching the work at the same time. Automatic alcohol torches also where tried but these had to be held in a certain position for best results and many times, just when things were ready to flow, the torch would buck and sputter.

A gas supply was found available but no air pressure. There was no compressor, so an

Vacuum-cleaner soldering torch

old vacuum cleaner was obtained. This was stripped down to motor and fan, and then hooked up to a purchased torch. The torch might have been made of tubing, but time was precious, hence a torch was procured for $2.50.

Then, a rubber cork of proper size with a hole in the center was secured from the chemical laboratory. This was placed where the bag had been attached to the cleaner. A metal tube was forced into the cork and a rubber hose attached to it. The other end of the hose was fastened to the air side of the

torch, and the gas line was hooked up to the gas side.

Because the fan ran at maximum speed when the current was turned on, a treadle rheostat of the type used with sewing-machine motors, was secured and inserted in the circuit. This controlled the air blast perfectly and the student can now sit at his work with his torch in hand and the flame under perfect control. Several of these soldering torches have since been made at the following approximate costs:

Torch	$2.50
Treadle	1.50
Hose (21 ft.)	.50
Discarded vacuum cleaner	No charge
Total cost	$4.50

FLOWER-BOWL HOLDER

Donald Towle,
St. Johnsbury, Vermont

The flower-bowl holder shown can be used either as a table center with candles on each side, or as a desk or shelf decoration. The project is very inexpensive and yet possesses a great attraction for the boys. A 5-in. ivy bowl can be secured for 10 cents at most five-and-ten-cent stores.

After the student selects his style of design for the sides, he makes the two sides the same shape. The half-lap joint should be carefully marked out and then cut for a tight fit.

For students who have exceptional ability in woodworking, an easy yet attractive design can be made by using simple carving tools.

The project, if made of gumwood, can be finished natural to match the candleholder shown and described on page 300 of the September, 1937, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

MAKING A PENHOLDER OF PLASTICS

J. B. Livingston, Ponca City, Oklahoma

One may make penholders of transparent blue, red, or green plastic rod to match corresponding colors of ink. These make most acceptable gifts.

Materials and Tools Required

The accompanying illustrations suggest patterns which may be followed. The author's preference, as illustrated in the photographs, was for mottled yellow and blue pens 6 in. long made of ⅜ by 6-in. round rods of plastics. Kits available from supply houses contain sufficient round rod and buffing compound for making the pen. The metal sleeve that fits into the end of the staff and holds the pen point can be obtained from a discarded wood penholder, or from penholders which can be bought at the dime stores for approximately two for a nickel. The tools required for this project are a flat file 6 or 8 in. long, fine grit sandpaper, speedwet paper of 240 and 320 grits, a ¼-in. drill bit and hand drill, some soft cloth for buffing, and some buffing compounds of both grades.

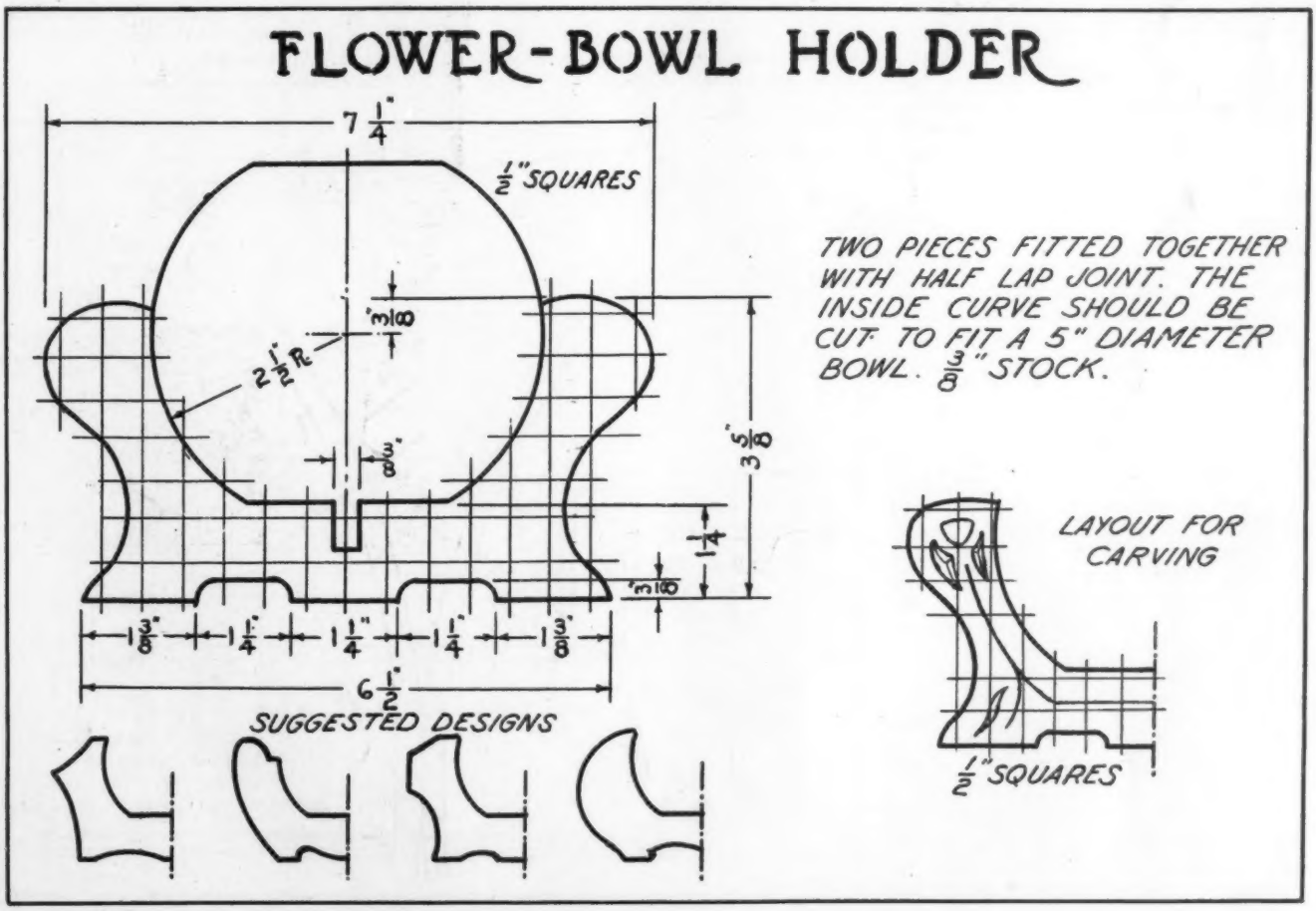
Shaping the Rod

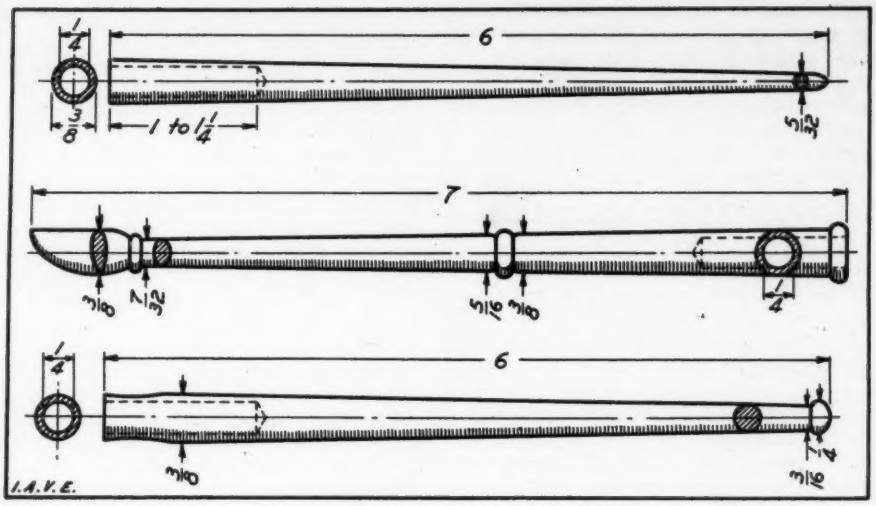
Begin by filing the ⅜-in. round rod to the shape desired. Hold the rod at one end with one hand and file away from you with the other hand. Let the plastic rod rest on the workbench or other firm support while being filed. A cabinet scraper is a good tool for removing excess plastic stock on a job like this.

If a lathe is available, the shaping process is simplified greatly. One end of the rod is gripped in the lathe chuck and the other end is supported by the 60-deg. center used in metal turning. It will be necessary to drill a small shallow hole in the end of the rod to fit the 60-deg. center, as the center cannot be forced into the plastic rod without damaging the rod. Turn with ordinary woodworking chisels, holding the chisel handle slightly higher than the tool's cutting edge. Slightly slower speeds than for wood turning are recommended, especially for the beginner in work with plastics.

Assembly

Now locate the center on the end to be drilled for the metal sleeve and prick a small starting hole for the drill point. It is preferable to use a speed drill such as a drill press or a hand drill, although the job may be done successfully with a brace and drill.





Penholders made of the new plastics

Clamp the penholder securely, but not too tightly, with a V-grooved wooden block in the vise. Drill in with the ¼-in drill bit just a little at a time, withdrawing the bit as often as necessary to keep the bit flutes from clogging up. Lack of care at this stage of construction may result in splitting the rod. The depth of the hole will be determined by the length of the metal sleeve to be inserted. Allow ⅛ in. of the sleeve to show outside the staff. Secure the sleeve in place with the special adhesive obtainable from the plastics company, or with any good metal cement.

Sanding and Polishing

After the penholder has been brought to the proper shape and the curves are made as graceful as possible, use the fine-grit sandpaper to dress out all deep scratches or file marks. The next step in finishing is to wet-sand the work with speedwet paper of the 240 grit. Sand out every visible tool mark or blemish left by the fine sandpaper. Follow this with a good sanding with the 320 grit of speedwet paper, wetting the paper often to keep the cuttings washed away. Pumice stone of equivalent grit may be substituted where speedwet paper is not available.

The final process is to buff the work to a rich glossy finish. For best results, the compounds recommended by the plastics manufacturer should be used. Buffing can be done by hand or with the aid of power-driven buffing wheels. The author has even fitted a buffing wheel to a hand-power grinder with good success and a great saving of effort over the hand method. Regardless of the equipment used, the cloth must be free from oil, grease, tripoli, or the oxidation left by metal polishing. A perfect finish can be had only with clean buffers. For best results, reserve one cloth or wheel for the coarse compound and the other for the final rouge polish. Do not allow the compounds to become mixed on the wheels. The final compound is the finest polish obtainable, and if contaminated with the coarse-grit polish will not bring out the fullest brilliance of plastic luster. Apply the preliminary polishing compound to the buffing cloth by rubbing, or if a rotating buffing wheel (3,000 r.p.m. recommended) is used, just press the cake of compound to the wheel surface until the wheel face is well coated and shows a dark color. Then press the surface to be polished, firmly against the coated wheel face, and move the work back and forth making sure that the entire area to be polished is brought into contact with the wheel.

For the final rouge polish, follow the same procedure as outlined for the preliminary polish. Only a few seconds of application with the final polish will be required if the preliminary polishing has been properly done. If the final polish clings to the surface of the work, it indicates there are tiny scratches or blemishes that should have been sanded or buffed out prior to the final polish application. The rouge will not stick to a perfectly polished surface, hence you have a ready check upon the thoroughness of your preliminary work.

When the polishing is completed, a pen point may be fitted to the clip and the penholder is ready to use.

Variations in surface ornamenting may be worked out by scratching small grooves around the penholder with a scratch awl, or with a needle point, and rubbing contrasting colored crayon or quick drying lacquer into the grooves. A yellow pen looks well with black lines, a red pen with white lines, and a brown pen with green lines.

SKI-TIP SPREADER

Ambrose B. Charette, 27th Street School, Milwaukee, Wisconsin

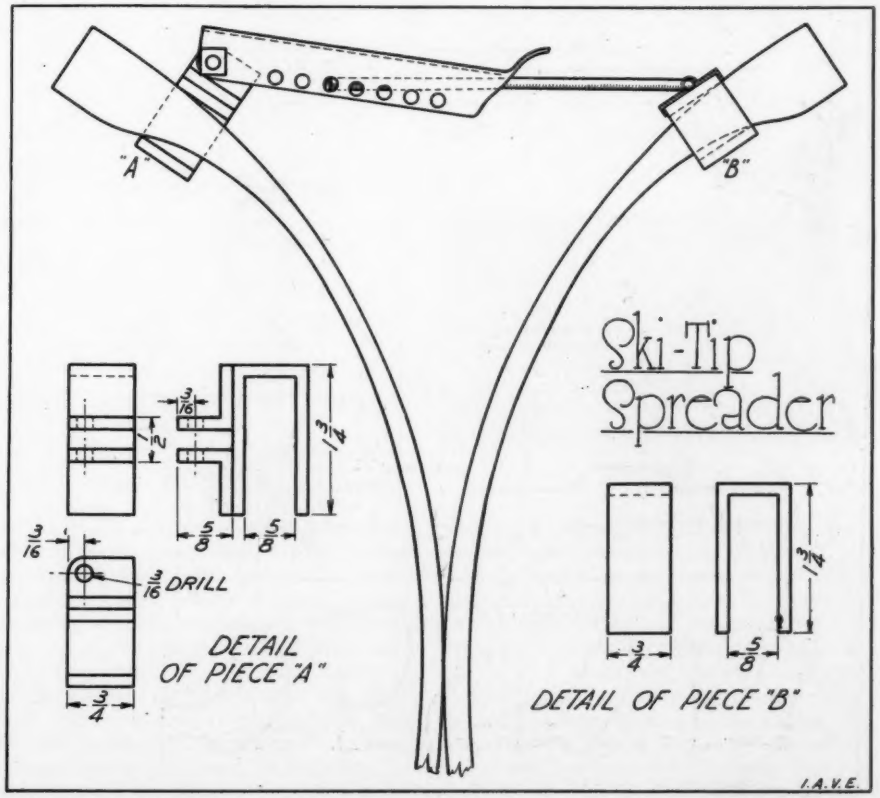
A good pair of skis is worth preservation, and above all things, the preservation of the original curve in the tip is very important.

The lever action of this spreader is taken from a pair of 19-cent metal shoe trees. If none are available, this section is easily made with a heavy wire and a sheet of metal.

The clamps which are fastened to each end of the lever are made of ⅛ by ¾ in. mild steel formed in a U shape.

Piece A has two short pieces of angle iron soldered to the clamp. Drill a 3/16-in. hole with the two pieces of angle iron in position. This section is bolted to the lever with a 3/16 by ⅝ in. r.h. stove bolt.

The original cleat which holds the wire end



of the lever to the toe of the shoe tree can be soldered to the piece shown at B.

Cut the wire part of the lever shorter and bend both ends outward.

Round all corners to prevent the metal from marring the finish of the wood.

Adjustments can be made by placing the wire in different holes while the lever is in a folded position.

OCTAGONAL SEWING BOX

Felton L. Harlan,
Reading, Pennsylvania

The design of the sewing box presented herewith was the outcome of several requests for a sewing box large enough to hold the weekly allotment of mending, and not be too cumbersome.

Many variations of this box may be made. It can also be made as elaborate as desired by the application of inlay on the top and side panels.

This project has a wide range of class appeal being suitable from 7th through the 12th grade with various treatments for the different groups.

An important suggestion in the construction is to glue and nail the 8 sides to the bottom. Make the sides ¼ in. higher than necessary. The tops of the 8 sides may be drawn together by the use of pinch dogs or small corrugated fasteners until the glue has dried, after which cut the extra ¼ in. off on circular saw. This, of course, will remove marks left by the fasteners. If many are to be made it may be well to make a jig to hold the top of the sides until the glue dries.

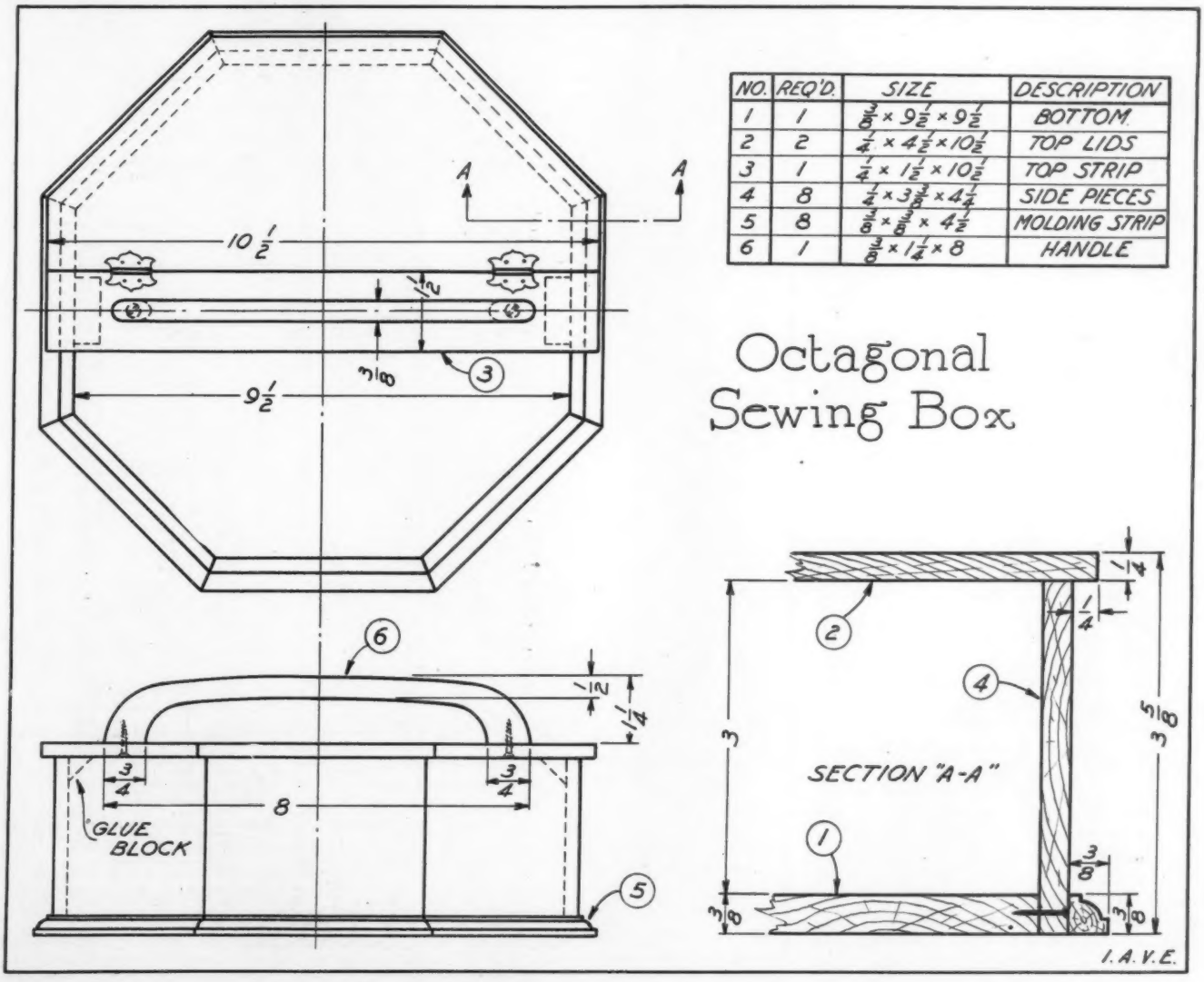
A RADIO WAVE TRAP

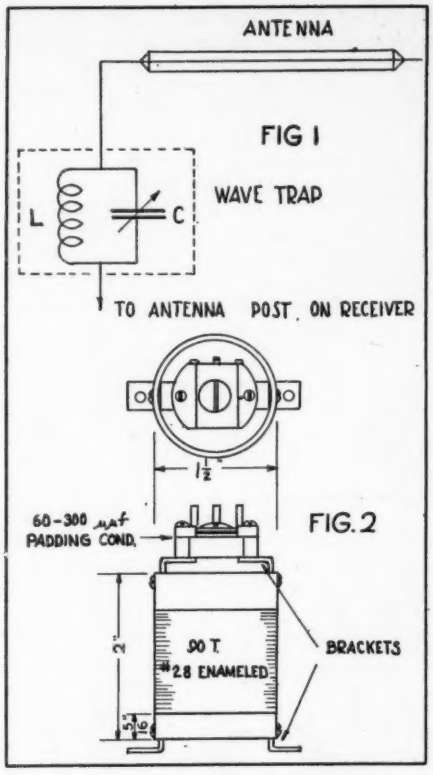
Gilbert Oberweiser, Milwaukee, Wisconsin

If a receiver is being operated very near a broadcasting station, it often becomes necessary to insert a wave trap in the antenna circuit to eliminate the interference caused by this local station. The technical function of the wave trap is to reduce the signal of the local station to a low enough level so as to allow the reception of other stations without interference. The trap, therefore, causes the local station, and *only* the local station, to be "tuned out" or blocked to a great extent. This is accomplished by inserting a coil and condenser in the antenna circuit of the receiver, and tuning this coil and condenser to the frequency of the local station.

A study of Figure 1 shows that the incoming signals from all stations are induced in the antenna. If a parallel resonance circuit, tuned to the interfering station, is introduced between the antenna and the receiver, this circuit will offer a very high impedance to the station, or frequency, for which it is tuned, while it offers very low impedance to other stations or frequencies. That is, the total reactance of the wave trap in Figure 1 is: $X_o = \frac{X_1 \; X_c}{X_1 + X_c}$. But since the current through the condenser is 180 degrees out of phase with that flowing through the reactance coil, the above equation, correctly written, becomes: $X_o = \frac{X_1 \; X_c}{X_1 + (-X_c)}$ or $X_o = \frac{X_1 \; X_c}{X_1 - X_c}$. By inspecting the last equation it can be seen that if X_1 equals X_c the total reactance becomes infinite. However, since both X_1 and X_c are functions of the frequency, the circuit will be in resonance for that frequency only,

NO.	REQ'D.	SIZE	DESCRIPTION
1	1	$\frac{3}{8} \times 9\frac{1}{2} \times 9\frac{1}{2}$	BOTTOM
2	2	$\frac{1}{4} \times 4\frac{1}{2} \times 10\frac{1}{2}$	TOP LIDS
3	1	$\frac{1}{4} \times 1\frac{1}{2} \times 10\frac{1}{2}$	TOP STRIP
4	8	$\frac{1}{4} \times 3\frac{3}{8} \times 4\frac{1}{4}$	SIDE PIECES
5	8	$\frac{3}{8} \times \frac{3}{8} \times 4\frac{1}{2}$	MOLDING STRIP
6	1	$\frac{3}{8} \times 1\frac{1}{4} \times 8$	HANDLE





Radio wave trap

since other frequencies will change the reactance of both the coil and condenser. If the condenser *C* is varied, its reactance will change and the circuit will be in resonance to another frequency where X_1 again equals X_c. This is the fundamental principle of the wave trap.

To operate the wave trap, the condenser *C* is varied until the circuit is in resonance to the frequency that is desired to be cut down. Actually, the wave trap will never have an infinite impedance at its resonance frequency because there is always a certain amount of resistance in the wire of coil *L*. This resistance will lower the total impedance of the parallel resonance circuit and will broaden out the tuning effect.

From the above then, it can be inferred that if the resistance of coil *L* is too small, the wire being very large, the station to which it is being tuned could not be heard at all. On the other hand, if the resistance of coil *L* is too large, the wave trap will not be effective enough and will begin cutting down the signals from other stations.

In the design of a wave trap it is best to strike a medium between the two extremes just mentioned, because of both the performance and possible compactness of the apparatus. A good compromise is the use of number 28 enameled wire for coil *L*. To obtain the correct inductance, the coil should be wound with 90 turns of No. 28 wire on tubing 1½ in. in diameter. If a 60 to 300 micromicrofarad padding condenser (the type adjustable with a screw driver) is used in conjunction with this coil, the wave trap should be capable of being adjusted to repress any desired station in the frequency range between 575 and 1275 kilocycles.

A suggestion for the mechanical construction of the above coil and condenser is shown in Figure 2.

As can be inferred from the above discussion concerning the theory of the wave trap, any parallel resonance circuit that is capable of being tuned to the broadcast band can be used as a wave trap. A tuning coil and condenser taken out of any tuned radio-frequency receiver, and connected as shown in Figure 1, will serve the purpose very well.

CHINA CLOSET

Harry W. Kroll, Senior High School, Rockford, Illinois

The suggested design of a china closet may be well adapted for advanced woodworking students. It encourages the use of a variety of machine operations. It also entails the designing of various members of this piece to harmonize with the furniture in use to which this piece is to be added.

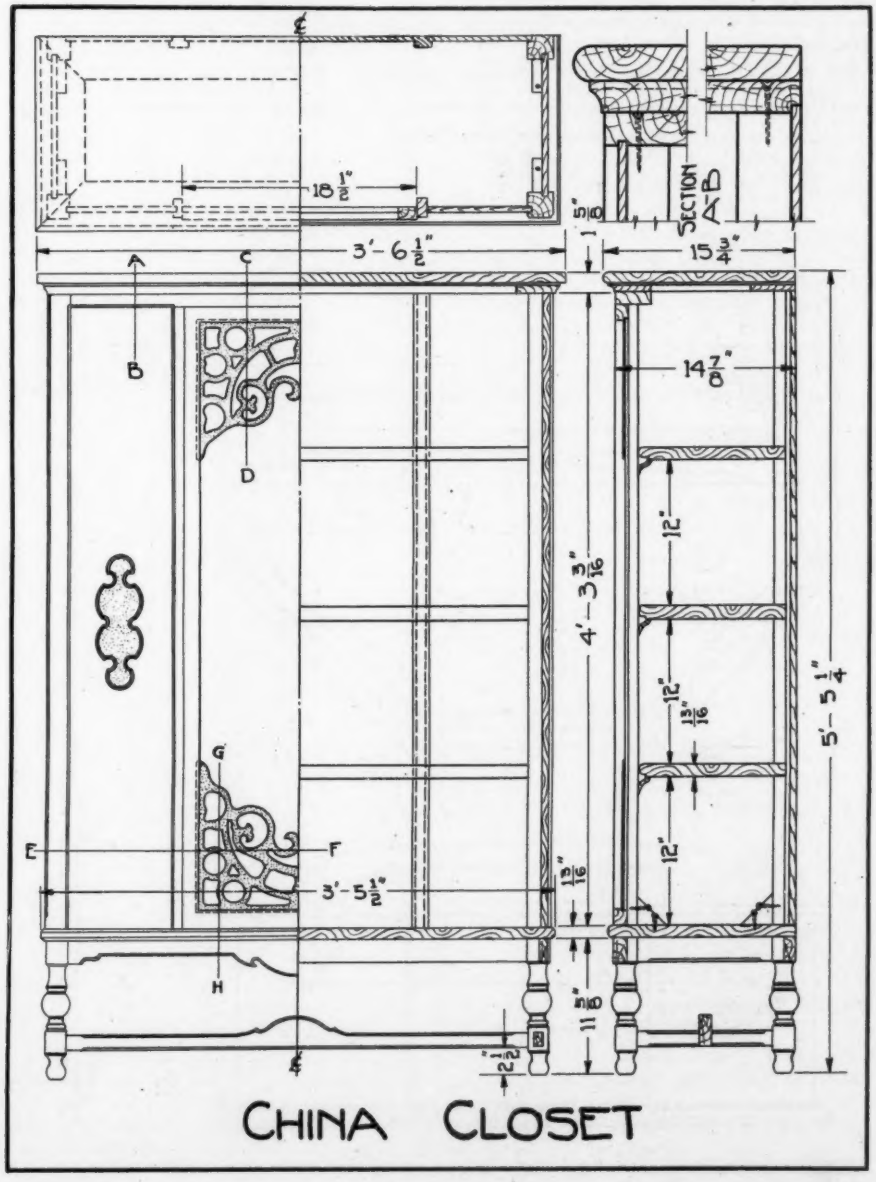
Various methods of construction may be followed, depending largely on whether it is a production job, individual construction, or a combination of both.

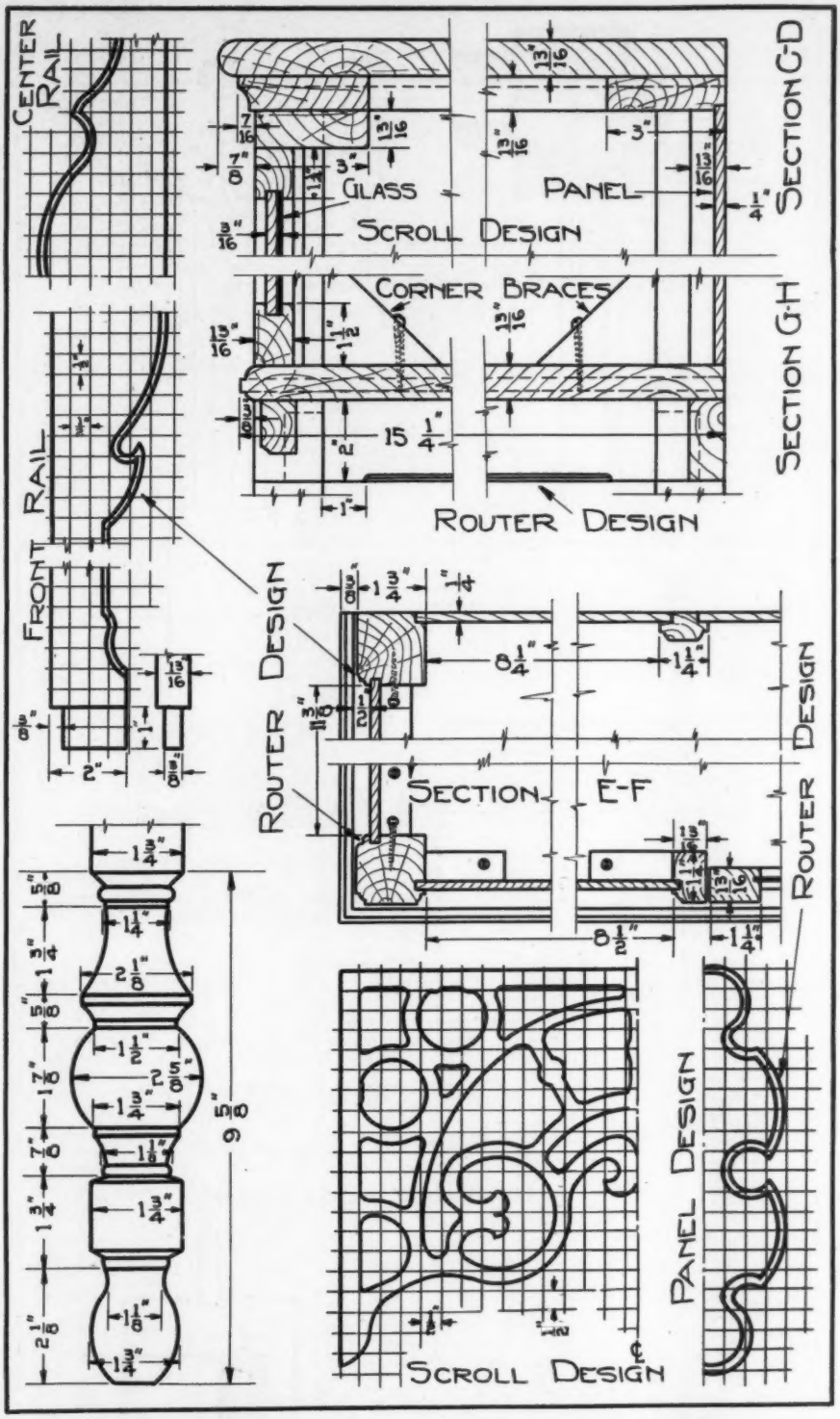
This problem may be enriched considerably by the use of a machine router, or of a universal plane. Those members on which the router is used are shown in the illustration. This work is done before assembling.

The two pieces for the scroll are tacked together and cut out as one piece.

The wood for the panel design should be cross-grained if possible, or should have a grain which is highly figurative. By staining slightly darker, very pleasing effects may be secured.

The china closet may be made of walnut or mahogany, stained, filled, varnished, and rubbed.





GOALS FOR INDUSTRIAL-ARTS TEACHERS

Hugh J. Betts, Supervisor of Industrial Arts, Knoxville, Tennessee

The eight goals listed deal with important aspects of the school shopwork.

1. *Books and Reference Materials.* (*a*) Are you making any effort to get the library department to supply materials needed for reference in your department? (*b*) Have you turned in any suggestions to me as to what books you need? (*c*) Are you requiring reference reading as an integral part of your course? (*d*) Get yourself and your department up to date by doing something about these questions.

2. *Dead Stock on Your Shelves.* Your success as a business executive is measured partially by your managing ability. To have materials on the shelves year after year unused is a sign of poor management. Although you have inherited some of the materials now on hand, it is your responsibility to devise ways of using this dead stock as soon as possible.

3. *Why Are Some Elective Shop Courses More Popular Than Others?* It is not the subject that governs the popularity of the course. The teacher who knows his field thoroughly and who truly reaches into the hearts and minds of the greatest number of boys has no trouble in filling elective classes.

4. *Have You Made a Personal Analysis of Yourself?* If your advanced courses are not in demand, then you have not sold yourself to the beginning classes. When advanced students and those who have left their school remark to other shop teachers the fact that they have wasted their time by taking the advanced course, or that these same students are able to do a better piece of work than the teacher himself, there is something seriously wrong with you.

5. *Are You Continuously Conscious That Your Shop is a Laboratory for Character Education?* What are you going to do about discovering abilities, aptitudes, peculiar personal habits, leadership abilities, organization ability, order and systematic procedure, power of visualization, initiative, self-reliance, judgment, neatness, artistic and industrial appreciation, pride in accomplishment, spirit of cooperation and punctuality, courtesy, service, and consideration of others?

6. *What Are You Telling Your Students Individually After You Discover or Develop Any of the Characteristics Mentioned in Question 5?* Do something about this and then answer to question 3 will not trouble you.

7. *What Are You Doing To Keep the Course Up To Date?* Information sheets, tests, and reference-assignment sheets are yet to be developed. Will you be the first or the last to make a start along these lines?

8. *In What Specific Ways Are You Correlating Your Work With the Whole School Program?* (*a*) If you do not know the correct principles of design and color, why not consult the art teacher? (*b*) Why not have some of your projects designed and finished by that department? You can learn by examples when you do not have time to complete a course in color and design. (*c*) If your boys do not like English, why not arrange with the English teacher to accept themes and other materials on shop topics? Give the boys credit for reading, writing, or reporting on topics in their English classes.

Why not furnish the mathematics teachers with a list of shop mathematic problems commonly found in your work? Probably the boys would like to work in mathematics if they could see a definite and tangible application of each problem.

How about looking over the science books and outlines to find ways that your department can better fit in? What principles and examples of general science are found in your shop which can be referred to the science teachers for lesson materials?

What about health and safety in the shop in relation to the regular health program in the school?

Why not urge the social-science teachers who are responsible for guidance and character

programs to visit the shops when seeking illustrations of certain character points?

Have you ever thought of writing an industrial-arts play with your boys as characters and all equipment furnished by the shop, to be given before the whole school in co-operation with the auditorium teacher?

Why not exchange your course-of-study outlines with other departments? Your charts, regulations, grading system, or other teaching aids might prove valuable to other teachers.

MINIATURE RAILWAY BLOCK SIGNAL

Frank D. Rohmer, Lincoln High School, Midland, Pennsylvania

The illustrations accompanying this article show the details of construction for a miniature block signal which was developed to provide a realistic toy-train accessory at a very small cost. Its operation is as follows:

It is hooked to the usual special insulated track section as shown in the wiring diagram. When the train is on the regular track and approaching the signal, the red light glows

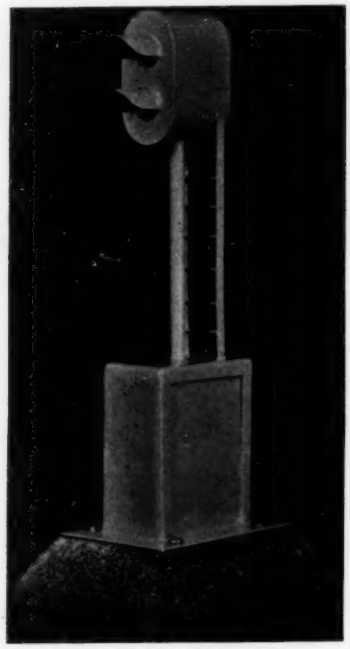


Figure 1. Miniature railway block signal

brightly since the current flows through connection No. 3 (from the third rail) through the solenoid coil which is of comparatively low resistance, and thence to the red light and so to the regular outside rail No. 2. As the train spans the special insulated rail section the solenoid and the green light are in parallel, the red light is extinguished and the green light burns brightly. Since the coil has a low resistance, when it is shunted across the track there would be a near short circuit, but this is overcome as shown in section C, Figure 3. This shows that there is a gravity-controlled iron core in the coil and when the coil is shunted with the green light, the strong magnetic pull draws the iron core into the coil and sets up a strong reactance thus effectively

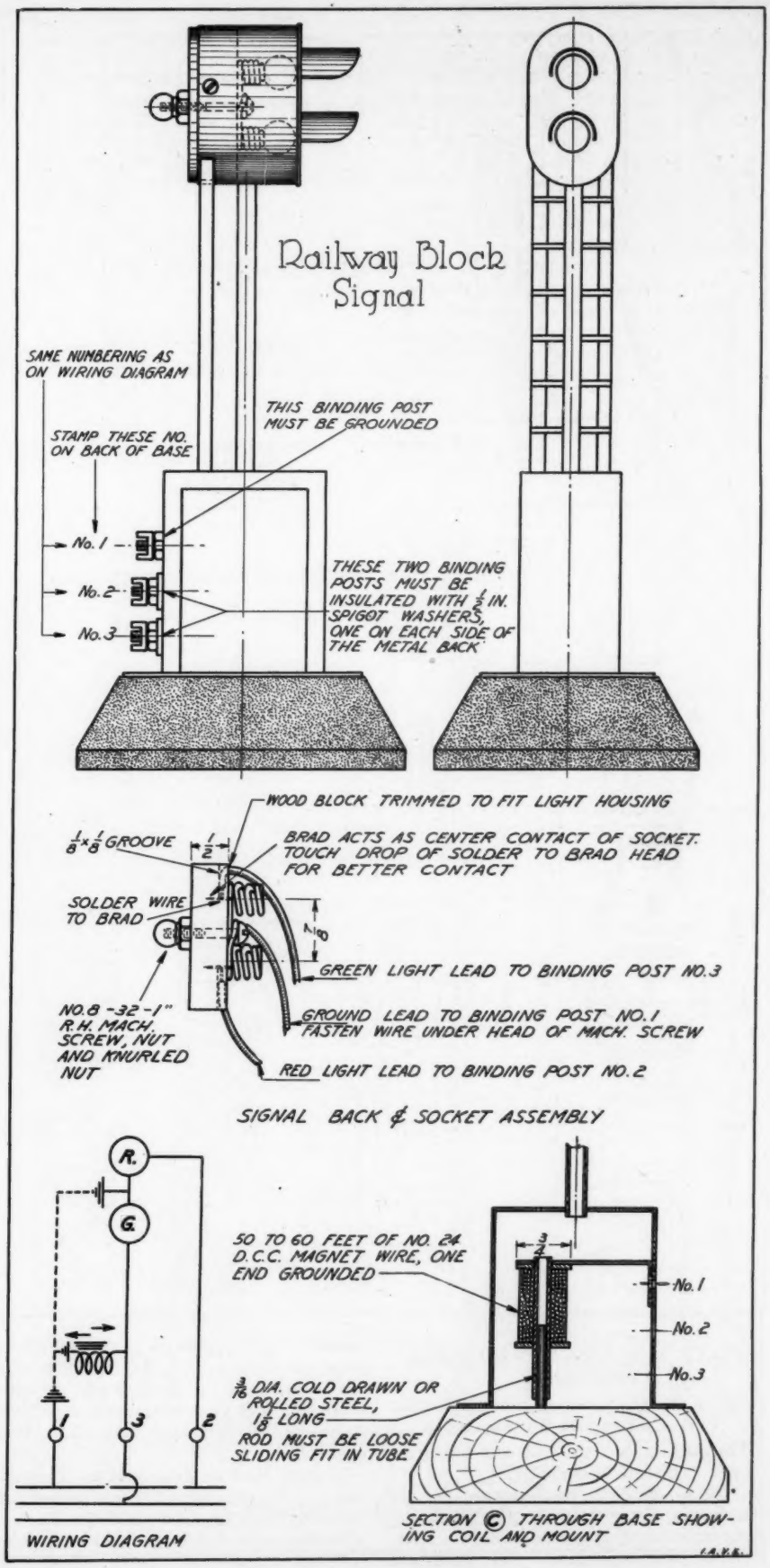

Railway Block Signal
SAME NUMBERING AS ON WIRING DIAGRAM
STAMP THESE NO. ON BACK OF BASE
THIS BINDING POST MUST BE GROUNDED
No. 1
No. 2
No. 3
THESE TWO BINDING POSTS MUST BE INSULATED WITH 1/2 IN. SPIGOT WASHERS, ONE ON EACH SIDE OF THE METAL BACK
WOOD BLOCK TRIMMED TO FIT LIGHT HOUSING
1/8 x 1/8 GROOVE
1/2
BRAD ACTS AS CENTER CONTACT OF SOCKET. TOUCH DROP OF SOLDER TO BRAD HEAD FOR BETTER CONTACT
SOLDER WIRE TO BRAD
1/2
GREEN LIGHT LEAD TO BINDING POST NO. 3
NO. 8 -32 -1" R.H. MACH. SCREW, NUT AND KNURLED NUT
GROUND LEAD TO BINDING POST NO. 1 FASTEN WIRE UNDER HEAD OF MACH. SCREW
RED LIGHT LEAD TO BINDING POST NO. 2
SIGNAL BACK & SOCKET ASSEMBLY
R.
G.
1
3
2
WIRING DIAGRAM
50 TO 60 FEET OF NO. 24 D.C.C. MAGNET WIRE, ONE END GROUNDED
3/4
No. 1
No. 2
No. 3
3/16 DIA. COLD DRAWN OR ROLLED STEEL, 1 1/8 LONG
ROD MUST BE LOOSE SLIDING FIT IN TUBE
SECTION © THROUGH BASE SHOWING COIL AND MOUNT

Fig. 1. Assembly and details

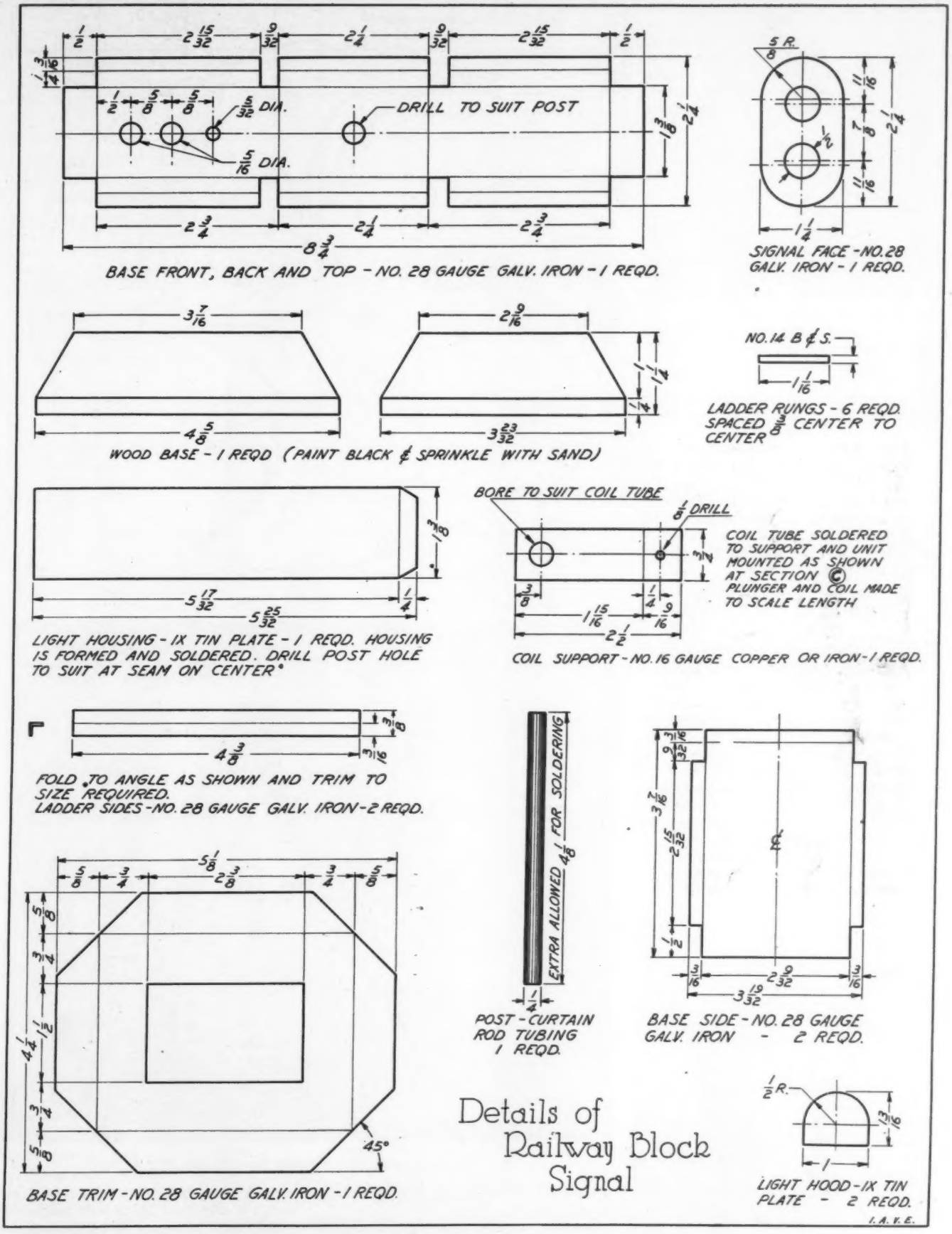

DRILL TO SUIT POST
BASE FRONT, BACK AND TOP - NO. 28 GAUGE GALV. IRON - 1 REQD.
SIGNAL FACE - NO. 28 GALV. IRON - 1 REQD.
WOOD BASE - 1 REQD (PAINT BLACK & SPRINKLE WITH SAND)
NO. 14 B & S.
LADDER RUNGS - 6 REQD. SPACED 3/8 CENTER TO CENTER
BORE TO SUIT COIL TUBE
1/8 DRILL
COIL TUBE SOLDERED TO SUPPORT AND UNIT MOUNTED AS SHOWN AT SECTION © PLUNGER AND COIL MADE TO SCALE LENGTH
LIGHT HOUSING - IX TIN PLATE - 1 REQD. HOUSING IS FORMED AND SOLDERED. DRILL POST HOLE TO SUIT AT SEAM ON CENTER.
COIL SUPPORT - NO. 16 GAUGE COPPER OR IRON - 1 REQD.
FOLD TO ANGLE AS SHOWN AND TRIM TO SIZE REQUIRED.
LADDER SIDES - NO. 28 GAUGE GALV. IRON - 2 REQD.
EXTRA ALLOWED FOR SOLDERING
POST - CURTAIN ROD TUBING 1 REQD.
BASE SIDE - NO. 28 GAUGE GALV. IRON - 2 REQD.
45°
BASE TRIM - NO. 28 GAUGE GALV. IRON - 1 REQD.
Details of Railway Block Signal
LIGHT HOOD - IX TIN PLATE - 2 REQD.
I. A. V. E.

Fig. 2. Details of railway block signal

checking the flow of current through the coil. The coil could be eliminated from the circuit by using lamps of different resistances, but as these are not readily available in miniature sizes, the solenoid circuit shown permits the use of the standard miniature 21-volt train-set bulbs with both of the same resistance.

The sheet-metal base may be made of the parts shown in Figure 2, or the younger boys lacking skill may substitute suitable cans. The sockets are made of No. 14 house wire. See Figure 3.

1. Strip insulation from a wire about 18 in. long.
2. At center of wire, twist a loop to fit under the head of machine screw.
3. Twist ends around miniature lamp base, thus forming two connected sockets.
4. Space socket centers to correspond with light holes in the signal face, ⅞ in. from center to center.
5. Cut off excess wire.
6. For socket center contacts, use small brads tipped with a drop of solder on heads *after being driven in place.*

The base trim piece shown in Figure 2, is cut out and filed smooth. The 5/16-in. edges are then folded to a 90-deg. angle, forming a box-shaped section. Assembled base is placed centrally in this section and the 5/16-in. sides are then folded flat. Holes to accommodate No. 8 by ¾-in. r.h. screws are then drilled through entire assembly.

CARVED LEAF TRAY

D. W. Prince,
Braintree, Massachusetts

The carving shown here has in its relief the flowing richness of the expensive professionally carved ones, yet it is a project in plain everyday wood carving. Its pattern and grace of line hint strongly of old English guild carvings formerly found on sturdy vessels in the ancient feasting halls.

Construction is a matter of no great effort. The stock consists of a piece of 1¼ by 11½ by 13⅛ in. maple, whitewood, birch, or any other close-grained wood. The pattern is drawn on paper bearing 1-in. squares. This pattern and the lines needed for roughing out, are then transferred to the stock with carbon paper. Roughing out may be done with gouges, or if a drill press is available, a spurless bit set to a depth of ½ in. will do the job in somewhat shorter time. The outline is best cut with a jig or band saw. Although the underside in this case was done on a molder, the jig- or band-saw table may be tilted to give the underside a slant that can be finished up artistically with smooth gouge and chisel strokes. The rough tray is secured to the bench with hold-downs and clamps so that both hands are free for carving in the detail. As the tray stands now, it is only roughed out. Transfer the details of the pattern to the wood and gradually bring the whole to a finished shape. Give considerable relief to the leaf lobes as shown in the illustrations, as this adds greatly to the appearance of the piece. Small irregularities of tooling are removed with fine sandpaper and steel wool.

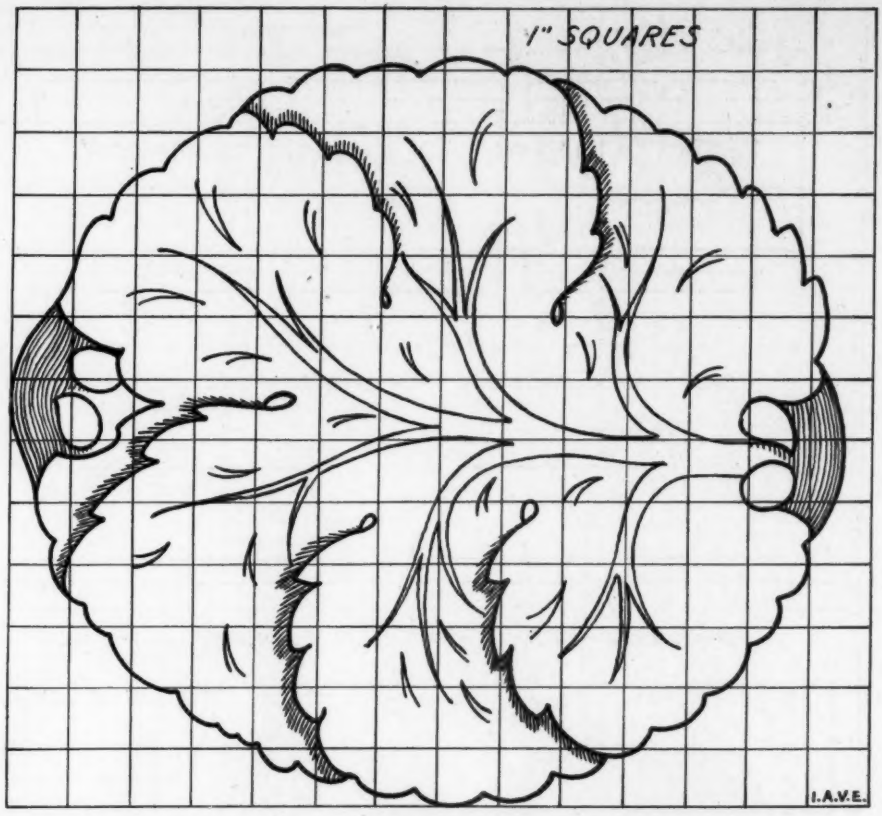


Fig. 1. Carved leaf tray

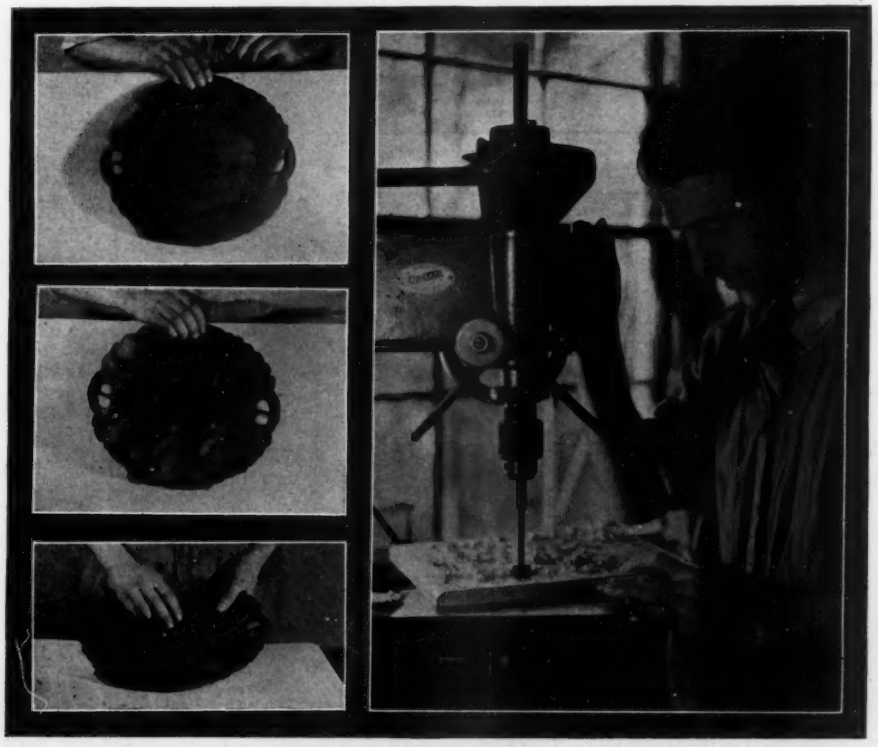


Fig. 2. The carved leaf tray, showing how the job may be done

A small curved scraper may be used to advantage also.

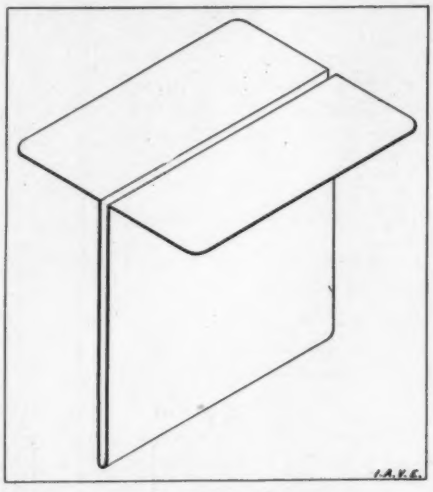
Finishing may be done in a number of ways. A plain, rubbed wax finish is good and does not taint food like a stain preparation would. High-lighting with burnt umber and

oil is very attractive. Artistically applied weak-stain shadings also give realism to the tray, taking advantage of the natural colorings of the leaf and its twigs. In any finish, it is best to give a moderately heavy coating of pure wax as a final step. A cloth and cake of preserving wax are the only requisites. The completed tray makes a fine buffet piece or fruit dish for the table.

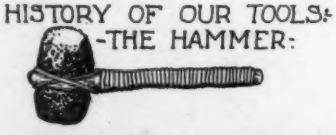
METAL-SHOP VISE GUARD

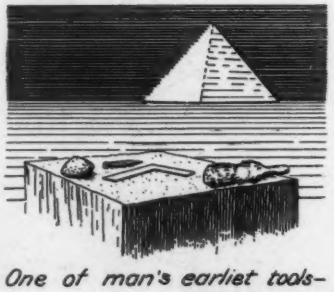
John J. Frick, Burbank Junior High School, Berkeley, California

Protecting guards usually made of two pieces of metal will be more convenient to handle if made in one piece. In using soft metals such as copper, brass, etc., vise jaws will leave a heavy marking on work if it is not protected with guards. The following sketch shows a simple aid for doing a better job in the metal shop. These vise guards, of course, must be made in various sizes to accommodate the different thicknesses of metal that will be worked upon.



Metal vise guard



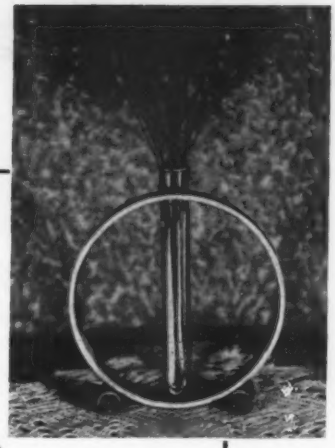


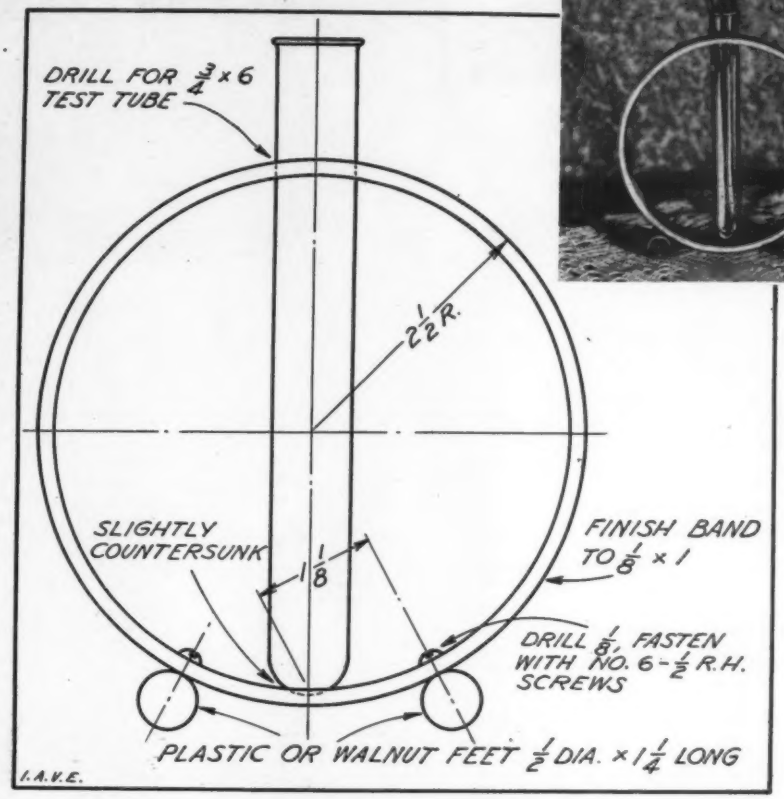
One of man's earliest tools- the hammer- was unknown to the builders of the Pyramids who pounded with a rock held in the hand or a billet of wood hewed to a handle at an end - E.M.Wyatt.

BUD VASE

Stanley Bowen, High School, Salem, New Jersey

The bud vase offers a nice project for either general-shop or metal-shop use. In the making of this vase, first make a wooden pattern, large enough to allow for machining, and then mold an aluminum ring. The cast ring is placed in the chuck of an engine lathe, and machined to the given dimensions. A jig will facilitate the drilling of the hole for the test tube, as well as the holes for the foot screws, if many vases are to be made. If a plastic material is used for the feet, it will be necessary to use drive screws to fasten them.




DRILL FOR 3/4 x 6 TEST TUBE
2 1/2 R.
SLIGHTLY COUNTERSUNK
1 1/8
FINISH BAND TO 1/8 x 1
DRILL 1/8, FASTEN WITH NO. 6 - 1/2 R.H. SCREWS
PLASTIC OR WALNUT FEET 1/2 DIA. x 1 1/4 LONG
I.A.V.E.

Bud vase designed by Stanley Bowen

In the event that a metalworking lathe is not available, the ring may be machined by holding it in a wooden chuck, on a wood turning lathe, and run at the slowest speed. The round-nose wood turning tool is used to shape the ring in this case.

Additional Sources of Boat Lumber and Decorative Cabinet Woods

The list of sources of supply mentioned in "Boat Lumber and Decorative Cabinet Woods," by Paul S. Emerson, page 7, January, 1938, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, may be augmented by the following addresses:

Frank Paxton Lumber Co.
Kansas City, Kansas, and Denver, Colorado
O'Brien Lumber Co.
2655 S. Damen Ave., Chicago, Ill.
T. A. Foley Lumber Co.
Paris, Ill.

Answers to Questions

FILLER AND FINISH FOR CEDAR

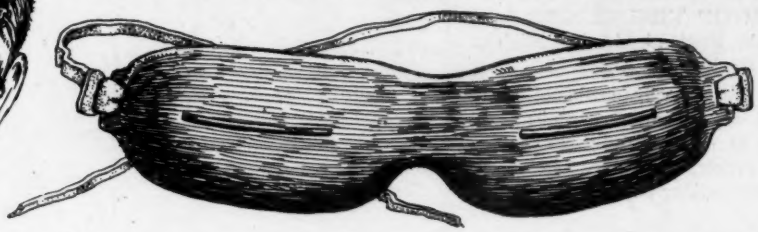
1009. Q.: Can you recommend or tell me where I can find some product which may be used as a filler for cedar? I have tried cedar plastic wood, Savogran, Seoco Crack Filler, Sheffield Crack Filler, Wood Fix, Cedar Stick Shellac, and Old English Crack Filler. I am using two finishes, oil and gas, 1 coat of shellac, and 2 or 3 coats of varnish, and same as former except no oil or gas is used. I would like to know where I can obtain a commercial filler to fill checks and knotholes. — *C. N. U.*

A.: In view of the large number of materials which you have used, apparently without complete satisfaction, I am suggesting a change in finishing practice, based on observation of a large and finely finished panel of red cedar which has been exposed to direct sunlight for five or more years. The upper half was finished in white shellac as a two-pound cut primer, sanded and then given three coats of varnish. The lower half was

(Continued on page 10A)

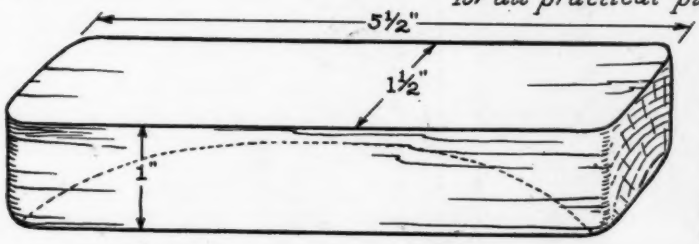
SNOW GOGGLES

PLATE BY W. BEN. HUNT, HALES CORNERS, WISCONSIN.



In extreme cases soot is also rubbed all around the eyes and on the lids.

These goggles do your squinting for you. They are used by Eskimos, Indians & trappers in the far north as a protection against snowblindness. The narrow slits and the blackened inner side keep out most of the intense glare of the sun on ice and snow and still enable the wearer to see well enough for all practical purposes.

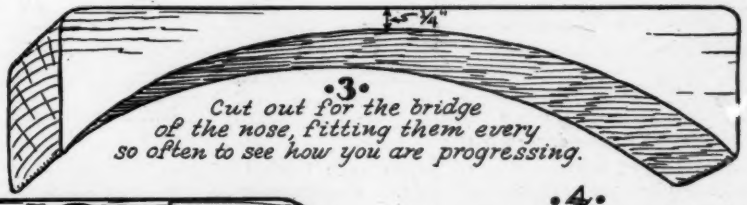


•1•

Any soft wood (or better still, walnut, of which the ones described are made) may be used. It should be straight grained. Round off the corners. Then with a piece of cardboard and shears make a template of the curve of the forehead at the line of the eyebrows.

•2•

Mark the line on the edge of the block and cut out as shown at right. Goggles should not fit too close or steam will form on the inside on cold days.



•3•

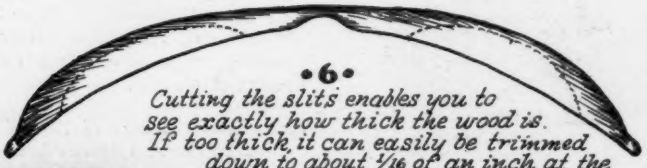
Cut out for the bridge of the nose, fitting them every so often to see how you are progressing.

•4•

Clamp in vise and cut out the depressions with a gouge or knife. The depressions or hollows should be from ⅜ to ½ inch deep at the deepest point.

•5•

Then cut away the surplus wood to about the shape shown here. → Care must be taken not to cut away too much at first. The slits are then cut out with the point of a knife and a keyhole saw if one is handy.



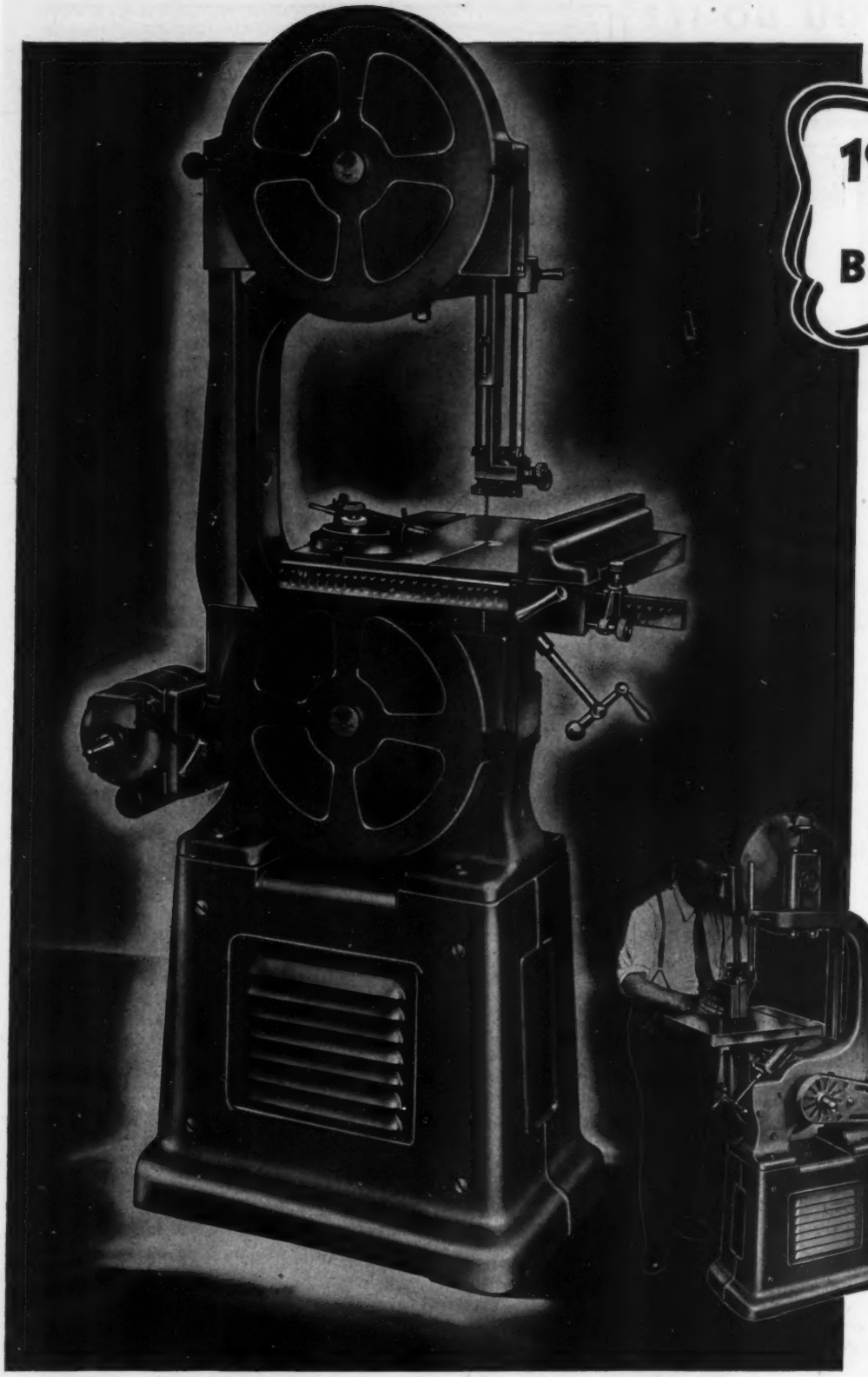
•6•

Cutting the slits enables you to see exactly how thick the wood is. If too thick it can easily be trimmed down to about 1/16 of an inch at the thinnest part which is right at the slit.

Cut small slots at the ends for buckskin thongs with which the goggles are tied on.

Inner side of completed goggles.

Paint the inside and the edges of the slits with a dull black paint. The outer side may be painted, shellaked or finished with a coat of linseed oil.



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Compare this 16" Band Saw with any on the market! See it at your dealer's or write for the new 1938 catalog describing Walker-Turner's three full lines of power tools in three price ranges. Walker-Turner Co., Inc., 1928 Berckman Street, Plainfield, N. J.

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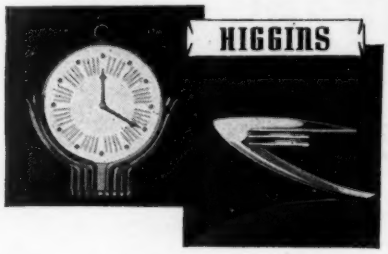

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Frank Paxton Lumber Company

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(Continued from page 83)

finished in varnish only. Both sections had small tear-outs which were filled with cold-water putty, shellac sticks, and lead and oil putty to match. The latter has stood up the best against expansion and contraction, as well as against the solvent action of the natural cedar oils. The lower section, finished in varnish alone, is remarkable for its rich and deep color, while the upper section, with the shellac primer has a dead gray look that is not at all pleasing.

This observation leads me to recommend that the panel be well sanded, given a well-brushed-out coat of four-hour floor varnish, dried overnight, sanded with No. 120 waterproof sandpaper, revarnished, dried three days, water-sanded with No. 120 waterproof sandpaper, chamoised off with a wash leather. The putty work can now be done although I generally prefer to do it on the unrubbed varnish coat in order to get a more perfect color match, using dry white lead, colors ground in oil and four-hour varnish as a binder. When worked out on a white plate, this will give a very smooth glazing putty that matches very readily the different colored parts. Let the putty dry hard, after tooling-in with a *flexible* putty knife, so that the thumbnail does not make much of a mark when drawn over the dried surface. The entire panel can then be water-sanded by backing up the paper with a 1-in. hard-felt pad, cutting down both putty and varnish to a fine, true surface. Let dry after water-rubbing at least four hours and then revarnish. Let the last coat dry one week and then water-rub or oil-rub as desired. If the oil-rubbing sludge is left on the work and a pad of water-wet white cotton waste used to produce the final rubbing pad, then that fine, deep velvety semigloss finish will be secured more easily than by any other method. Clean off with a good polish. — *Ralph G. Waring.*

"OLD WORLD FINISH" FOR MAHOGANY

1010. Q.: Would you kindly advise me how to secure a finish on mahogany that is very pleasing and popular at this time, called by the trade name "Old World Finish"? Information as to the company selling this stain would also be appreciated. — *R. J.*

A.: The "Old World Finish" is a reddish brown shade of mahogany that is very pleasing indeed. A new type of stain has been developed, in a water solution, which is very fast drying, can be sanded under half an hour, has good penetration and is nonfugitive. This is made by the Woodfinishing Products Co., 34 Industrial St., New York City, and sells for a dollar a gallon, I believe. Unlike most water stains, this new type does not raise the grain, and in itself is a fine material for use as a shade coat with the spray touch-up gun, although I like the results of using the brush best for the main body staining. Let stain dry hard, seal with a very thin coat of half orange and half white shellac reduced with four parts of alcohol. Let dry, sand with a split No. 6/0 paper, dust off and fill with a deep brown colored silex filler, well wiped off and picked. Dry this coat 24 hours in a warm room. Then varnish, one, two, or three coats as desired. The resultant finish should be thin and tough, without any of the old-time heavy varnish effect. The last coat should be oil-rubbed with crude oil and FFF pumice stone and while still covered with rubbing sludge should be gone over finally with a heavy pad of new white cotton waste loosely wrung out of water. This combination of oil and water rubbing gives the surface that ideal amount of gloss which is rich and in good taste. — *Ralph G. Waring.*

Personal News

¶ Mr. William A. Brock has resigned the superintendency of the Thaddeus Stevens Industrial School, Lancaster, Pa., to become director of vocational education of that city.

¶ Mr. Walter M. Arnold has been named superintendent of the Thaddeus Stevens Industrial School in Lancaster, Pa.

¶ Mr. George McLaughlin, of Lancaster, Pa., has been appointed to the principalship of the New York Trade School in New York City.

¶ Mr. John A. Tima has been appointed instructor in industrial arts in the schools of Montoursville, Pa.

¶ Mr. William H. Armstrong, of Monessen, Pa., has been appointed to a teaching position in Pennsylvania State College, State College, Pa.

(Continued on page 12A)

Published January 1938 . . .

NEW SECOND EDITIONS
in the Cass Technical High School Series of Mathematics Books

▲

TECHNICAL MATHEMATICS

By H. M. KEAL, *Head of Mathematics Department, Cass Technical High School, Detroit, and* C. J. LEONARD, *Head of Mathematics Department, Southeastern High School, Detroit.*

"Technical Mathematics" has been assembled rather than written. The mathematics required in the shops, laboratories and drawing rooms of Cass Technical High School was listed by semesters, after which a practical, working combination of these needs was made and given a thorough test in actual classroom work. In the present revised edition the authors have included formulas and graphs on the newer sciences — aeronautics, radio and air conditioning. The equations conform even more closely to the types usually encountered in technical subjects.

Volume I. The Equation, the Formula and the Graph

The early need of the formula has made the algebraic equation the primary consideration in the first volume. Graphic representation has been kept constantly before the students from the second chapter of Volume I throughout the series. Ratio and proportion likewise have a very important place in the first year's work, and form with the equation and the formula the main part of the first unit. This book covers, in all, the work of three semesters.

246 pages; 123 illus.; 4¾ by 7; $1.25

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The second unit of "Technical Mathematics" is primarily geometry, including both plane and solid. The book contains all that is ordinarily taught in plane and solid geometry, and many technical applications as well. The essentials of this unit can be covered in two semesters, but there is ample material for three semesters' work. A treatment of the geometry of the sphere has been added.

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Volume III has been assembled to complete the mathematics which a student of high-school grade is able to master and apply. An attempt has been made to keep the algebraic processes and geometric conceptions in the minds of students while the topics usually encountered in trigonometry are developed. Whereas the first and second volumes introduce and present some common problems of the right triangle, Volume III presents more involved problems of the right triangle and introduces interpolation.

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MATHEMATICS FOR SHOP AND DRAWING STUDENTS

By H. M. Keal and C. J. Leonard

The purpose of these two books is to give to industrial workers and to students not going to college those parts of algebra, geometry and trigonometry which would be most likely to occur in their technical work and study. The books are planned to present the material in a manner which will enable the student to master it with a minimum of outside help.

ELECTRICAL: *225 pages; 146 illus.; 4¾ by 7; $1.60*

SHOP & DRAWING: *225 pages; 190 illus.; 4¾ by 7; $1.60*

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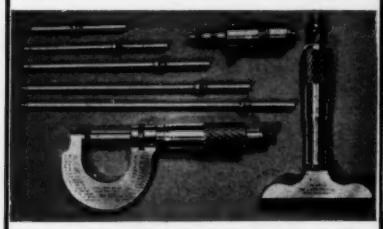

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(Continued from page 10A)

¶ Mr. Herschel James has been appointed supervisor of industrial arts at the Pennsylvania State College, State College, Pa.

¶ Mr. Paul D. Wright, of Altoona, Pa., has been appointed to a teaching position in the industrial engineering department of Penn State College.

¶ Prof. Russell H. Landis, of the Eastern Illinois State Teachers' College, Charleston, has enrolled in the Department of Industrial Education at Pennsylvania State College, State College, Pa.

¶ Mr. James Waln, formerly a supervisor in Allegany County, Md., has been appointed to the position of supervisor of apprentices at the Bethlehem Steel Plant, Sparrows Point, Md.

¶ Ruth Van Sickle Ford has been appointed to the position of president-director of the Chicago Academy of Fine Arts. She held the position of instructor of art at Beloit College for five years, and was also a member of the staff of the Chicago Academy of Fine Arts for fifteen years.

Association News

¶ The A.V.A. convention held at Baltimore, Md., December 1 to 4, 1937, was successful both as to program content and as to attendance. C. W. Sylvester, Director Vocational Education, Baltimore, and treasurer of the A.V.A. deserves great commendation for the efficiency with which he and his coworkers engineered the convention arrangements.

Those in attendance were kept extremely busy most of the time. The entire program was well planned and those who enjoyed breakfast and luncheon meetings, banquets, and the like, had full opportunity to indulge in this form of activity. Visits and trips of all kinds to schools, industrial establishments, and points of historic interest were made by a great many of those who had come to attend this important educational convention at the monumental city. Probably one of the most educational treats was the trip arranged to the Johns Hopkins School of Hygiene where the visitors were given an opportunity to hear a lecture by Dr. McCollum who has made such extensive studies on vitamins. From the first general session on Wednesday evening at which the convention theme "Vocational Education and Progress — American Style" was presented by local and nationally known speakers, the meetings all showed especially good attendance. With the extensive offerings made by the programs of the different sections, it was very difficult to decide which sessions to attend.

The annual banquet was again attended by such large numbers that not all could be accommodated. A. K. Getman, President of the A.V.A., presided at this banquet. An appreciable number of life memberships were announced and many prominent personages in the field of vocational education were introduced. Contrary to the usual attitude of labor toward vocational education, Joseph P. McCurdy, President, Maryland State and District of Columbia Federation of Labor, Baltimore, Md., voiced the opinion that vocational education was not conducted in a manner acceptable to labor. The common consensus of opinion among those who heard his address was that Mr. McCurdy had not made a careful study of what vocational education is trying to do and actually accomplishing when he made the sweeping statements which he employed in his address.

It was unfortunate that John W. Studebaker, United States Commissioner of Education, Washington, D. C., whose name was on the program, found it impossible to attend even though he did send a very able substitute.

The entertainment and the dance which followed the banquet were enjoyed by many.

The combined section on Thursday morning presented a well-chosen program of subjects on the integration and correlation of agriculture, commerce, guidance, industrial arts, and industrial education with general education.

R. W. Selvidge, Professor of Industrial Education, University of Missouri, Columbia, Mo., was chairman at this meeting and the speakers were: J. A. Linke, Chief of the Agricultural Education Service, U. S. Office of Education, Washington, D. C.; Paul S. Lomax, Professor of Education, New York University, New York City; Franklin J. Keller, Principal, Metropolitan Vocational High School, New York City; Verne C. Fryklund, Associate Professor and Supervisor of Industrial Education, Wayne University, Detroit, Mich.; and John A. McCarthy, Assistant State Commissioner of Education, in charge of Vocational Education, Trenton, N. J.

Robert Hoppock, National Occupational Conference, New York City, summarized the several addresses. He called attention to the challenge which the speakers had extended to the fields of industrial arts and vocational education, and the emphasis which they had placed on the need for open-mindedness and willingness to work hard at solving the many problems confronting the teachers in the various fields. He pointed out that the speakers had emphasized the need of bring-

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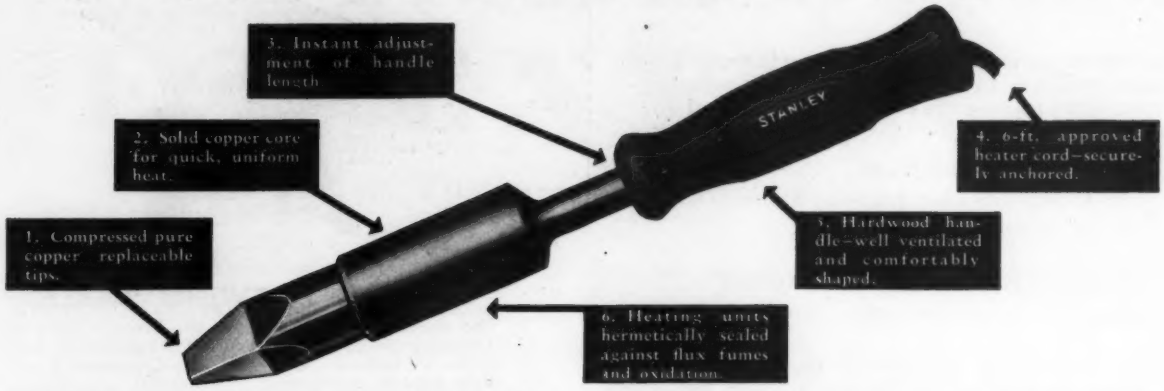
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These new electric Soldering Irons are the up-to-date tools for general soldering. They are designed to deliver ample, steady, uniform heat. Compare them to the old soldering copper and gas furnace method.

Light in weight, perfectly balanced, they will prove to be the most convenient and practical for the boys in your shop to use on all kinds of soldering work.

Stanley Soldering Irons are made in eight sizes — from 52 watts with a 7/16″ tip to 435 watts and a 1-9/16″ tip. The No. 340 Iron (95 watts) is recommended for general soldering in the school shop. Descriptive folder sent on request.

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ing practice abreast of research, the upgrading of ethics for business and industry and the securing of the wholehearted efforts of employer, labor, and the school in preparing youth for the life that confronts it. He also drew attention to the fact that the speakers had almost unanimously emphasized the need to adjust our training to the requirements of business and industry, and that a continuous study of the labor market should be made in order that the school keep step with the requirements put upon its product. He also showed the necessity of doing something about training proper personalities since two thirds of the jobs lost may be traced to the fact that the workers who were dismissed had personality defects which made them undesirable on the job.

(To be continued)

¶ The New England Arts' Teachers' Association held its second annual convention in Boston, on November 5 and 6. President Arthur Feuerstein presided at the meeting.

The convention opened with a dinner at which W. J. West, special agent for the Federal Bureau of Investigation, was the main speaker. Reports of the chairmen of the various committees were presented.

On Saturday there was a breakfast at the Hotel Lenox, at which Harvey H. Wheaton, of Concordia, N. H., presided. Willis B. Anthony, of the State Teachers' College, Fitchburg, Mass., explained the objectives of the Epsilon Pi Tau Fraternity. A visit was made to the Mechanic Arts High School where a display of projects of industrial-arts schools was exhibited.

At the business meeting the following officers were elected: President, Morris P. Cates, Portland, Me.; vice-president, John Cave, New Haven, Conn.; secretary, Willis B. Anthony, Fitchburg, Mass.; treasurer, Richard A. F. Ballou, Providence, R. I.

(Continued on page 14A)

The New England Arts Teachers Association Convention held in Boston, Mass.

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1st Prize—$25 2nd Prize—$15 3rd Prize—$01

Also plaque engraved with the names of the winning team and awarded to the school submitting the best group of mechanical drawings for one or both projects.

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DEALERS EVERYWHERE

(Continued from page 13A)

The vice-presidents for the states are Charles Lanuerkin, Arthur I. Martin, Harvey H. Wheaton, Joseph B. Lanza, William L. Schaller, and Fred Martin.—*Douglas M. Stevenson.*

¶ The annual dinner and roundup of the Oswego Normal Boys' Club, will be held at the Hotel Lincoln, 44th Street and 8th Avenue, New York City, on March 12, 1938, at 6:30 p.m. Mr. W. D. Church, Cliffside Park, N. J., is the president.

¶ The fifty-ninth annual convention of the Texas Teachers' Association was held November 25 to 27, in Houston, Texas. Included in the sectional programs were sessions devoted to art, commercial guidance, home economics, industrial education, industrial arts, trades and industries, and vocational agriculture.

At the first session, Dr. Bradford Knapp, president of the Texas Technological College, addressed the larger group on the subject, "Hands as Well as Heads and Hearts."

The new guidance section was well attended, with considerable interest concerning the guidance problem from the angles of the elementary school, the junior and senior high school, the junior college, and the state department.

At the industrial-education section Dr. C. F. Arrowwood, of the University of Texas, discussed "Vocational Education in England." Other speakers were Prof. E. L. Williams, who spoke on "How the Industrial-Arts Teacher Can Promote a Program"; Regional Agent Fred Earhart, who discussed "Apprentice Training at Home and Abroad"; and Federal Agent C. E. Rakestraw, who took for his subject, "The Interdependence of Industrial Arts, Vocational Education, and General Education."

The half-day session for industrial-arts men, presided over by Victor L. Bowers, of Gladewater, included addresses as follows: "Prevocational Education in England," Dr. C. F. Arrowhead, of Austin; "A General Course in Metalwork for High Schools," George W. Kibler, Commerce; "How the Industrial Arts and the Art Department Can Co-operatively and Efficiently Function," Ruth Dozier, Nacogdoches; and "Sponsoring Future Craftsmen of America," Julian Mason, Nacogdoches.

The session of the Trades and Industries group, in charge of Mr. C. E. Troutz, San Antonio, included group discussions following papers on "An Integrated Program for a Modern Vocational School," by Mrs. Bess H. Stratton, San Antonio; "A Diversified Occupations Program Possibilities," by Charles A. Hall, Houston.

Resolutions were passed commending the services of the late State Director Ray L. Martin.—*Victor J. Smith.*

New Publications

Guidance for Youth

By Frank G. Davis, Ph.D., and Carnall Davis, M.A. Cloth, 387 pages, illustrated. Price, $1.56. Published by Ginn and Company, Boston, Mass.

This book consists of three parts, the first of which is devoted to educational guidance informing youth of the necessity of education in the world today. Part II gives occupational information on general farming, dairying, poultry raising, stock raising, truck gardening, forestry, mining, automobile service, carpentry, cabinetmaking, masonry, plastering, painting, and paperhanging, electricity, plumbing, dressmaking, millinery, transportation, manufacturing, advertising, insurance, restaurant management, merchandising, pharmacy, secretarial work, accounting, architecture, dentistry, education, engineering, journalism, law, library work, medicine, nursing, social work, civil service, and homemaking. Part III is on general guidance, giving directions on self-study, getting a job, what to do when not working, and how to study occupations.

Free-Hand and Perspective Drawing

By Herbert E. Everett and William H. Lawrence. Cloth, 142 pages, illustrated. Price, $1.50. Published by the American Technical Society, Chicago, Ill.

This book is designed for the student of architectural drawing. The section devoted to free-hand drawing, describes the drawing of the classical forms of ornamentation so frequently found in architecture. The section on perspective covers the rules for ordinary perspective and for parallel or one-point perspective.

News Notes

¶ A conference on visual instruction will be held at Stout Institute, Menomonie, Wis., on January 20 and 21, 1938. Its purpose is to provide basic information and experience in the use of visual aids and to promote wider and better application of one of the most efficient teaching methods. The program, taking these purposes in view, provided two full days of carefully selected demonstrations, lectures, and exhibitions.

The conference was organized by a committee appointed as a result of the visual-education

(Continued on page 17A)

An effective text for beginners in metalworking

METALWORK ESSENTIALS

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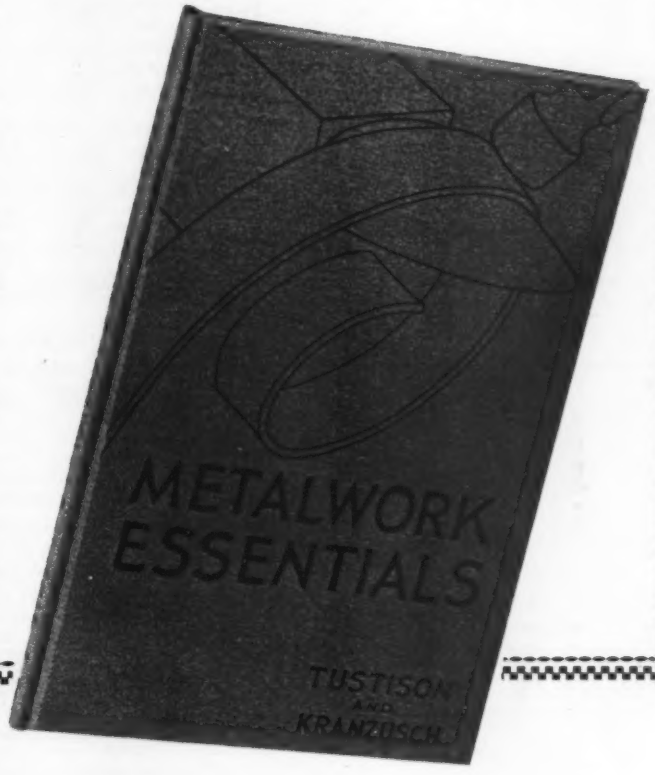
The best objectives of the junior-high-school shop are met in this increasingly popular new course. It is divided into thirty-three units, each involving basic information and directions for work and composed of elementary experiences selected from the whole range of metal-working. The hand-tool manipulations of cutting, shaping, forming, fastening, and finishing the common metals are presented and the authors show that skills involved have a wide application in any occupation or general life activity. Typical projects serve the purpose of making the operations realistic. More than 250 well-chosen illustrations make the work as nearly self-instructing as possible. The metal processes can be performed with simple hand tools and with a minimum of equipment thus increasing the value of the course for the school shop which is meagerly equipped. $1.50



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By R. L. Welch
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A COURSE IN SHEET METAL WORK
By J. W. Bollinger
88 cents

MACHINE SHOP PRACTICE
By Harry A. Jones
Book I, $2.00; Book II, $2.50

55 NEW TIN-CAN PROJECTS
By Joseph J. Lukowitz
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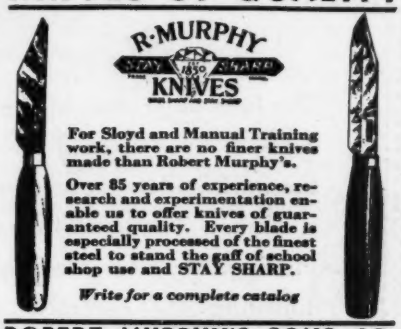

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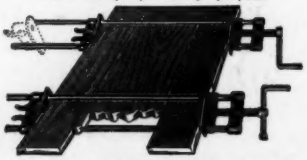

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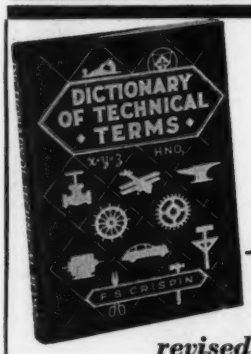

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(Continued from page 14A)

section meeting held at Green Bay, in May, 1937.

¶ Establishment of a group of scholarships at the Carnegie Institute of Technology, Schenley Park, Pa., by the Westinghouse Electric and Manufacturing Company, as part of a co-operative engineering plan between the company and the college, has been announced by Dr. Webster N. Jones, director of the college of engineering at the Carnegie Institute.

The scholarships are in engineering, are undergraduate in character, and will be known as the George Westinghouse scholarships. There will be approximately fifty of these scholarships, of which ten will be vacated each year upon the graduation of the student. Each scholarship has a total value of $3,000, payable monthly, at the rate of $50 for the five-year period of the course. The first ten of the scholarships go into effect on June 1, 1938.

Students who receive scholarships must take the regular engineering course at Carnegie, and must in addition spend the summer months and two college semesters at the Westinghouse plant. The co-operative plan of study offers unusual opportunities for combining theoretical training with practical experience. At the age of 22 to 24, the participants will have completed a four-year formal engineering course, and at the same time, will have acquired a substantial background of approximately two years' industrial experience. The course will be organized and administered by the George Westinghouse professor of engineering to be appointed.

¶ A course for waiters and waitresses is being offered in Knoxville, Tenn., in co-operation with the Knoxville Restaurant Association. The course runs for eight weeks and is conducted two days each week by Miss Charlotte Fisher.

¶ A unique set of home-room programs in mimeographed form has been prepared, under the direction of Supervisor Curtis Gentry of the vocational-guidance department of Knoxville, Tenn. The programs are available to teachers in junior and senior high schools who are engaged in teaching character education, manners, and custom.

¶ Courses in the factories and shops of Knoxville, Tenn., are being expanded this year, and the faculty at the Technical High School has been doubled.

¶ A new School of Education Building is included in the $6,500,000 building program, just started on the Pennsylvania State College campus, State College, Pa. The building will cost approximately $300,000 and will provide a central location for the School of Education, as well as for the industrial-education department.

¶ The A.V.A., through its committee on research, has begun an occupational survey of the city of Williamsport, Pa. The survey is being conducted by Mr. O. R. LeBeau and Mr. George Parkes.

¶ In the future, the entire four years of the resident program of industrial education, at Pennsylvania State College, State College, Pa., will be administered by the Department of Industrial Education. The program has been strengthened through the appointment of several instructors who are particularly interested in students of industrial education who want to enter the profession of teaching.

¶ A new addition to the Technical High School, St. Cloud, Minn., includes a wing for expansion of the shop course. This wing provides for building trades, mechanical drawing, and machine drafting, and other general-shop courses to be added to the curriculum of the school. The courses already in operation include printing, mechanical drawing, general shop, and gas engine. The building will be completed at a cost of $250,000.

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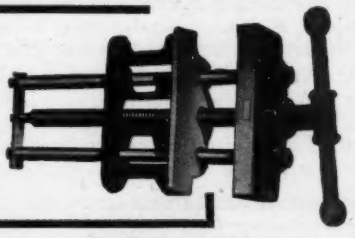

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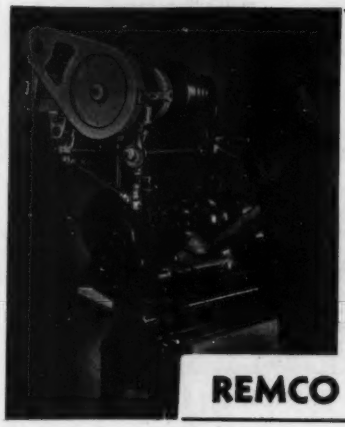

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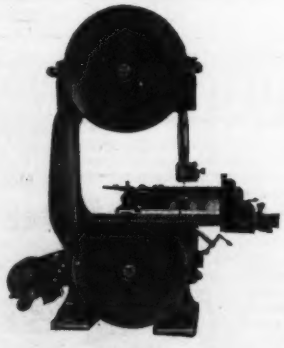
New Products

¶ The new 16-in. band saw, just announced by the Walker-Turner Co., Inc., of Plainfield, N. J., is a tool to be used as a saw-of-all work, and provides the versatility, capacity, and speed of the large machine in the field of the small power tool with its low price range.



The Walker-Turner band saw has a rigid frame, rubber-faced carefully balanced wheels, the latter being mounted on precision ball bearings. The blade and upper-wheel adjusting mechanism is mounted on two ground-steel rods, with cushion spring to absorb the blade shock. The roller guides are of oil-impregnated bronze. They are equipped with ball bearings. A ½-h.p. capacitor-start motor is provided. The saw is equipped with all-round wheel guards, back blade guard, and telescoping front guard, so that the blade is fully guarded at all times. Rigorous tests under actual working conditions have proved that this 16-in. band saw will stand up under continuous and strenuous operation.

School-shop instructors who are interested may obtain a copy of Catalog No. 46, illustrating and describing the 1938 model workshop lathe.

¶ The No. 1299 "Keen Knife" manufactured by Stanley Tools, New Britain, Conn., is a useful tool for carving, trimming, and decorating fiber insulating board, for opening cartons, cutting paper, leather, auto-top and upholstery materials, oil-cloth, linoleum, asbestos, cardboard, rubber, rope, fabricoid, and other similar materials.

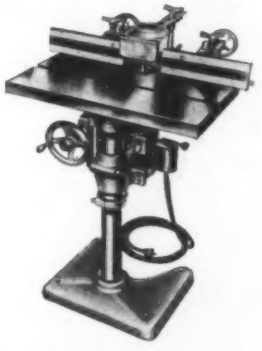
The handle is made of cast iron, perforated with holes for lightness. It is finished with black japan. A fastening screw holds the two halves of the handle together. Inside the handle is a compartment for extra razor-type blades used with the knife. Five of the blades are furnished with each "Keen Knife."

Complete information is available from the Stanley Tools, New Britain, Conn.

¶ The Walker-Turner Co., Inc., of Plainfield, N. J., has added a spindle shaper to its extensive line of power tools.

This new shaper has no belts or pulleys, thus eliminating friction and wear, and securing substantial savings and safety to the operator.

Among the important features of this machine is the geared-motor drive, the motor and gear shafts are mounted on ball bearings, and the motor-and-arbor unit is movable up and down a seamless steel column for a distance of 6 in. The spindle turns at 7600 r.p.m. by precision gears built into the motor and the motor switch and guide control wheels and locks are conveniently accessible.



The machine is useful for shaping as well as for sanding, tenoning, dadoing, reeding, fluting, surface grinding, panel carving, making corners, and other operations.

¶ The new 9-in. workshop precision lathe, just announced by the South Bend Lathe Works, South Bend, Ind., has many new features and is capable of performing all types of lathe work. It is equipped to cut screw threads from 4 to 112 per inch, and has longitudinal feeds of .002 to .015 in. per spindle revolution. The 12-speed model of the 9-in. workshop lathe series has spindle speeds ranging from 40 to 1,200 r.p.m., and is adaptable to machining small-diameter

(Continued on page 21A)

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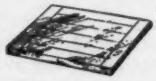
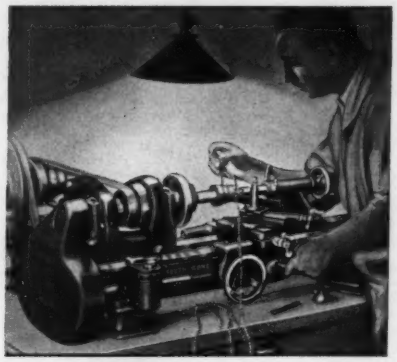


United States Blue Print Paper Co.
207 South Wabash Ave. Chicago, Illinois

(Continued from page 19A)

parts of steel, cast iron, brass, aluminum, bronze, and other metals with great accuracy.

Other features of the 9-in. workshop lathe include: A simplified twin gear reverse for cutting right- and left-hand screw threads; improved back-geared headstock with adjustable and larger spindle bearings and a ball thrust bearing on the ¾-in. hollow steel spindle; a heavier designed



saddle with adjustable gibs on cross feed and compound rest; a precision lead screw guaranteed to meet the most exacting requirements for cutting accurate screw threads on master taps, precision thread gauges, etc., and all gear teeth are precision cut from solid steel or semisteel blanks.

The different types of the 9-in. workshop lathe are: (1) The new 12-speed lathe; (2) the adjustable horizontal motor-driven bench lathe; (3) the underneath belt motor-driven bench lathe; (4) the pedestal adjustable motor-driven floor leg lathe; (5) the double friction countershaft driven lathe; (6) the 9- to 11-in. swing raising block lathe, and (7) the toolroom lathe with draw-in collet chuck, graduated taper attachment, thread dial indicator, micrometer carriage stop, and chip pan.

The lathe is provided with more than 35 attachments which may be used to increase its range of operations and to make it an all-purpose tool for the automobile repair shop, the home workshop, and trade-school and high-school machine shops.

¶ School-shop instructors who are interested in a quality complete workshop with an interesting combination of tools and accessories, at a very low price, will find the Handee Workshop, manufactured by the Chicago Wheel & Mfg. Company, Chicago, suited to their needs.

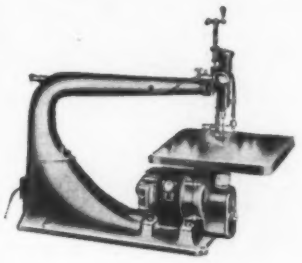
The Handee Workshop is an interesting combination machine for work on all wood, resins, and plastics. It is just what the shop instructor has been looking for—a whole shop full of real precision tools that give smooth, efficient performance; that occupy small space; and that are sold at a low price.

The equipment includes a lathe with ability to turn wood 8 inches between centers, 3 inches in diameter for face turning; drill press; router; spindle carver; spindle polisher; sander; grinder; shaper for all kinds of molding cuts; surface grinder; in all, 12 machines in one.

The equipment is powered by an HW type DeLuxe Handee, indentical in size and shape to the one regularly advertised. One of the advantages of the machine is its "boyproof" feature.

Complete information is available by writing to the Chicago Wheel & Mfg. Company at 1101 West Monroe St., Chicago, Ill.

¶ A jig saw of entirely new design, with unique motor drive "fingertip" speed control, and adjustable "motion" blade tensioner has just been placed on the market by the Walker-Turner Company, Inc., of Plainfield, N. J. The new Walker-Turner jig saw is built on the principle of the built-in motor, its mechanism is similar to the crankshaft on an automobile, it has a minimum of moving parts, and a motor deliver-



ing a new maximum of power direct to the saw blade. The saw has no belts or pulleys, and all mechanism is completely housed for safety.

The Walker-Turner Company manufactures two direct-drive jig saws, with two-speed and single-speed motors. These are described in its new 1938 catalog, which is available to school-shop instructors.

NEW TRADE CATALOGS

¶ The new Catalog No. 46, just issued by the South Bend Lathe Works, South Bend, Ind., describes and illustrates the firm's line of 9-in. workshop precision lathes, and lists various attachments and accessories designed to be used with these lathes.

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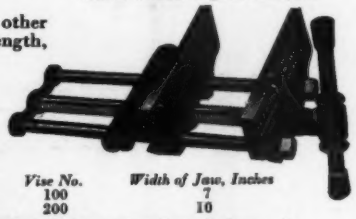

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200	10

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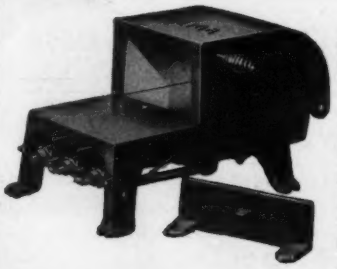

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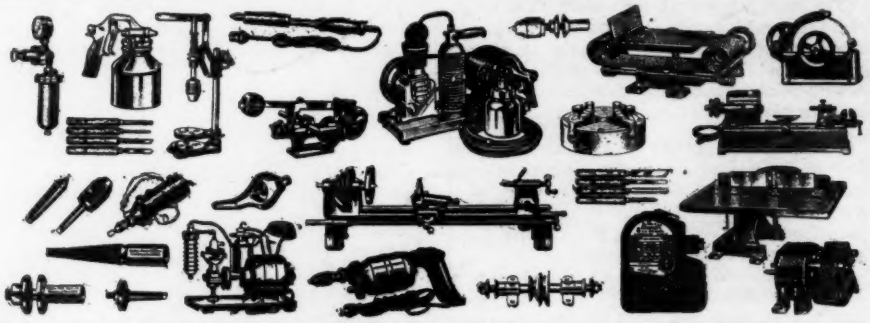

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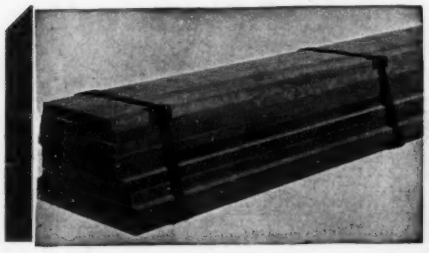

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